

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society

MEDICAL LIBRARY

PUBLISHED MONTHLY BY THE MINNESOTA STATE MEDICAL ASSOCIATION

Volume 18
Number 8

AUGUST, 1935

40 cents a copy
\$3.00 a year

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Loose Stools in Infants

require extra diapering, and inconvenience the mother

Clinically, loose stools are accompanied by a dehydration which, when excessive or long continued, interferes with the baby's normal gain. A long-continued depletion of water is serious, since "the fluid requirements of an infant are tremendous. A normal infant 15 pounds in weight will frequently excrete as much as one litre of urine per day. A negative water balance for more than a very short period is incompatible with life." (Brown and Tisdall)

Moreover, when the condition is superimposed by chance infection, the delicate balance may be seriously upset, since the infant's reserves have already been drawn upon, so that resistance to infection and dangerous forms of diarrhea may be too low for safety. Every physician dreads diarrhea, which Holt and McIntosh call "the commonest ailment of infants in the summer months."

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HISTORICAL NOTES ON THE MINNESOTA VALLEY MEDICAL ASSOCIATION AND THE SOUTHERN MINNESOTA MEDICAL ASSOCIATION*

MONTE C. PIPER, M.D.

Rochester, Minnesota

IN coming to Mankato to attend a meeting of the Southern Minnesota Medical Association, there is a certain satisfaction as of a family reunion at the ancestral home, for, while the Southern Minnesota Medical Association was organized at Winona and the Minnesota Valley Medical Association was organized at Le Sueur, each has designated Mankato as the selected city for its annual meeting at some time during its history. Also the greatest number of meetings of this Association has been held in Mankato, this of 1934 being the sixteenth. Hence, it would be voicing the sentiments of all members to say that we are happy to return home again. Hospitality of the Blue Earth County Medical Society has always been graciously extended, and many traditions, of which the association may be proud, have been established here.

The thanks of the association are hereby extended to the Blue Earth County Medical Society, to the members of your committees who have given their efforts to make this meeting so worthwhile, to the officers and citizens of your city who have coöperated, to the members of the staff of the *Mankato Free Press*, who have always extended a helping hand, and to the members of your Ladies' Auxiliary who have made the program of entertainment for our families so enjoyable.

To view in retrospect with you some of the traditions which have gone into building up the personality of the Southern Minnesota Medical Association, the medical records of these component societies have been investigated.

More than half a century ago, after the country was convalescing from the scourge of that terrible malady, the Civil War, there were physicians in this youthful state of Minnesota who must have been strong individualists. Methods of practice had caused each to become self-reliant, and induced each to exert his influence to help the community as well as to practice his profession. Yet these individualists realized that there were others in their neighborhoods who had similar problems, and were of similar personality and characteristics, and when these neighbors had opportunity for exchanging ideas, they found that they could be a help to each other. Organized medicine had been set up previously in the American Medical Association, the state medical societies and the county medical societies, but the county societies were limited by political boundaries.

These individualists desired a common meeting place where they could give and receive the benefits of association with one another. Probably after several conferences among certain leaders of those days and exchanges of letters, the idea of a medical association for mutual benefit was conceived. It is said that the physicians of Mankato first presented the idea. Railroads were the chief means of travel between cities, and the "Omaha Road" was the chief "arterial" of the Minnesota River Valley.

In October, 1880, Dr. Otis Ayer, of Le Sueur, wrote to some physicians of his choice asking them to convene at Le Sueur on December 1. At this convention the names recorded were those of Dr. Otis Ayer and Dr. George D. Swayne, of Le Sueur; Dr. C. F. Warner, Dr. Z. G. Harrington and Dr. E. J. Davis, of Man-

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Read before the Southern Minnesota Medical Association, Mankato, August 13, 1934.

kato; Dr. C. F. Merritt, of St. Peter; and Dr. Alfred Mueller, of New Ulm. Possibly there were others, but the record is lacking. Here they organized the Minnesota Valley Medical Association on December 1, 1880, and adapted the by-laws of the Ramsey County Medical Society as a foundation for their government. The roster of charter members includes Dr. Otis Ayer, Le Sueur; Dr. C. K. Bartlett, Minneapolis; Dr. D. B. Collins, St. Peter; Dr. R. O. Craig, Janesville; Dr. E. J. Davis, Mankato; Dr. A. W. Daniels, St. Peter; Dr. Z. G. Harrington, Mankato; Dr. James J. Henry, Mankato; Dr. G. F. Merritt, St. Peter; Dr. G. R. Maloney, Belle Plaine; Dr. George D. Swayne, Le Sueur (Wahpeton, N. D.); Dr. Charles J. Spratt, Minneapolis; and Dr. C. F. Warner, Mankato. By 1883 the roster contained forty-five names, the mention of many of which would recall to your memory pioneers of our communities. Dr. H. M. Workman of Tracy was a member in 1881, and surely would have been a charter member had he lived on the Omaha Road at that time.

Dr. Otis Ayer was honored with being chosen the first president. A photograph of Dr. Ayer has not been obtained, but a brief résumé of his biography is convincing evidence of his individuality. Dr. Ayer was born in New Hampton, N. H., in 1817; he read medicine with Dr. John A. Dana of his native city and graduated from Dartmouth in 1841 and from Jefferson Medical College in 1842; he practiced medicine in New Hampton for eleven years, and came to Le Sueur in 1856; but returned to his home and came back to Le Sueur in 1857 to remain. It is said that Dr. W. W. Mayo preceded him in settling in Le Sueur by a few months, but Dr. Mayo had moved to Rochester before the organization of the Minnesota Valley Medical Association. Dr. Ayer was surgeon to the Second Minnesota Regiment of Volunteers and was taken prisoner but was soon released. He was president of the Minnesota State Medical Association in 1877. He died in 1889.

Dr. C. F. Warner, of Mankato (photograph), was first vice-president, one of Mankato's strong characters and a lovable physician. He came to Mankato in 1869, had served in the Civil War as assistant surgeon to the 136th New York Volunteers and later as surgeon to the 58th New York National Guards. He died in Mankato in

1910. Dr. A. W. Daniels, of St. Peter (photograph), was second vice-president. Asa Wilder Daniels was truly a pioneer of this state; he was born in Stratford, N. H., in 1829, and attended the Boston School of Medicine. He arrived by river boat at St. Paul, July 4, 1853. He was soon appointed United States Government Surgeon at the Lower Sioux Agency between Fort Ridgely and Redwood Falls, and was a close friend of Little Crow. In 1854 he used chloroform anesthesia to amputate the arm of La Frombois, a grandson of Chief Sleepy Eye. This is the first recorded use of chloroform northwest of the Mississippi River. In 1862 he joined the Volunteers who went to the relief of New Ulm when it was besieged by the hostile Sioux. He was lost for three days in a blizzard in 1873. He contributed chapters to Folwell's "History of Minnesota." He died in 1923 at the age of ninety-four years.

Dr. Alfred P. Mueller, of New Ulm (photograph), was third vice-president. Dr. Mueller came from Berne, Switzerland, where he was born in 1825. He came to Stillwater in 1856, and to Fort Ridgely during the Indian outbreak, where he remained and directed the hospital. Many thrilling records of his services to the wounded and ill are recorded. His wife, Eliza Mueller, is revered for her heroic work as a nurse to the unfortunates of that day. Her works were commemorated by the state legislature in 1877, which authorized a tablet on her grave to be inscribed, "The State of Minnesota to the Memory of Eliza Mueller." Dr. Mueller returned to Switzerland, where he died in 1896.

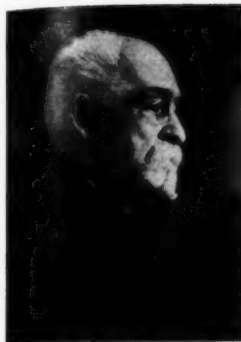
Dr. C. F. Merritt, of St. Peter (photograph), was Treasurer of this association during its thirty-one years of existence, and also when it became amalgamated with the new Southern Minnesota Medical Association, until his death in 1921. He was born in Danville, N. Y., in 1846.

Dr. George D. Swayne, of Le Sueur, was the first secretary. No further record of Dr. Swayne is at hand.

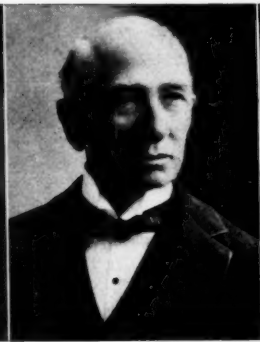
The foregoing were the officers. It would have been of interest to have shown a photograph and to have given a short biography of each of the earliest members; the reading of the roster of names, however, must suffice. All were individualists.

Drs. C. K. Bartlett, J. H. James and D. B.

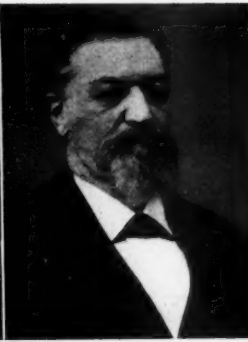
HISTORICAL NOTES—PIPER



Dr. C. F. Warner



Dr. A. W. Daniels



Dr. A. P. Mueller



Dr. C. F. Merritt

Collins were from St. Peter. Drs. J. W. Andrews, William Frisbee, William Jacoby, W. R. McMahon, Z. G. Harrington, C. F. Warner and E. J. Davis were from Mankato. Others were as follows:

Dr. Charles Berry, New Ulm; Dr. Ira Bishop, Mapleton; Dr. R. Parkin, Minnesota Lake; Dr. E. T. Case, Waterville; Dr. Straw, Wells; Dr. O. H. McMichael, Vernon Center; Dr. Garrett Murphy, Garden City; Dr. R. McGuire, Blue Earth City; Drs. H. H. Herring, and W. R. Cullen, Lake Crystal; Dr. M. Mickelson, Delavan; Drs. C. O. Cooley and Joe McMahon, Madelia; Dr. C. R. Bacon, St. James; Dr. Green, Windom; Dr. J. F. Force, Heron Lake; Drs. C. O. Moore, R. B. Barber and Craft, Worthington; Dr. E. B. Haynes, Winnebago Agency; Dr. C. L. Remington, Alma City; Drs. R. O. Craig and McDonald, Janesville; Drs. M. V. Hunt, D. S. Cummings and Young, Waseca; Dr. A. J. Wedge, Albert Lea; Dr. W. Dodge, Henderson; Dr. T. W. Hammond, Montgomery; Dr. Mahoney, Belle Plaine; Drs. E. P. Hartley and Lewis, Carver; and Drs. J. H. Dunn and Lord, Shakopee.

There are many others in the later roster, many of whom leave pictures in one's mind, surrounded almost by a halo of reverential memory.

The presidents of the Minnesota Valley Medical Association held office in the following order: Dr. Otis Ayer, Dr. C. K. Bartlett, Dr. C. F. Warner, Dr. D. S. Cummings, Dr. Z. G. Harrington, Dr. H. M. Workman, Dr. Charles Berry, Dr. C. O. Cooley, Dr. E. J. Davis, Dr. D. B. Collins and Dr. W. H. Rowe.

The Minnesota Valley Medical Association was the first district medical organization in the

state, although others soon followed. Dues were fifty cents and originally it was decided that no banquets were to be held. Money was said to be scarce in those days, and finances were not to act as a barrier to desirable members. The meetings were conducted somewhat after the manner of Methodist Class Meetings; that is, members would report cases which had occurred in their practice since the last meeting, the cases being discussed by other members. This society existed for thirty-one years.

Much of the foregoing record has been obtained from an historical article published by Dr. E. J. Davis, of the Soldiers' Home, in the *St. Paul Medical Journal*. The secretarial records are not at hand and probably are lost. It is hoped, however, that they may be found and placed in the records.

* * *

The second chapter of the history has to deal with the formation of the original Southern Minnesota Medical Association. There had been for some years an agitation to form an association similar to the Minnesota Valley Medical Association among the physicians of Rochester, Winona, Owatonna and the communities along the Winona and St. Peter Railroad. Consequently, in 1892, letters were sent out by Rochester doctors calling a meeting at Winona for July 28. The need for such an organization was appreciated, thirty-five physicians attended, and the association was founded on that day.

The Committee on Permanent Organization consisted of Drs. W. T. Adams, of Elgin, W. J. Mayo, of Rochester, and J. B. McGaughey, of Winona. The name Southern Minnesota Medical Association was adopted, and the rules and

regulations of the American Medical Association were selected in so far as they were adaptable to the requirements. All members of county medical units were eligible, and the proposed territory was the southern tier of counties. The function of the society was to be entirely nonpolitical; all such political matters as might come up were to be settled by the various county societies. Dues were 50 cents. Dr. Franklin Staples, of Winona, was the first president (photograph). Dr. Horace H. Witherstine, of Rochester (photograph), was the first secretary-treasurer, and he held the office until 1898. It is of interest to note the rather cryptic notation in the records of the treasurer after the entries of receipts and disbursements, "short \$7.50."

The first paper was by Dr. McGaughey (photograph), on "Cerebrospinal Meningitis"; the second paper was by Dr. W. J. Mayo on "Less Common Forms of Surgical Tuberculosis." Meetings were held annually in Winona, Rochester, or Owatonna, in churches, hotels, court-houses, or hospitals. Once the members met in the Episcopal parsonage at Winona. The second meeting was conducted in the Rochester State Hospital, with the members of the association as guests of the superintendent of the hospital, Dr. A. F. Kilbourne, who was also the second president of the association, and who has ever continued to be one of its enthusiastic members. At this second meeting, Drs. W. A. Jones, of Minneapolis, and Thomas McDavitt, of St. Paul, participated in the program.

The association seemed to fill a definite need, for it grew and made for itself a place in the medical life of southeastern Minnesota. The programs were varied, and it is of interest today to review these old records for they portray the trend of medical thought on many topics which have a bearing on our present-day medical problems. Most of the participants in the programs were members, and outside, or guest, speakers were comparatively few until later years. Much of the time was apparently given over to free discussion of the topics. As many as seven or eight physicians frequently took part in a single discussion. For example, in 1895, the topic "The Pathology of the Vermiform Appendix" aroused "general participation on the discussion of this paper and all sides of the pathology were presented." Again, the sym-

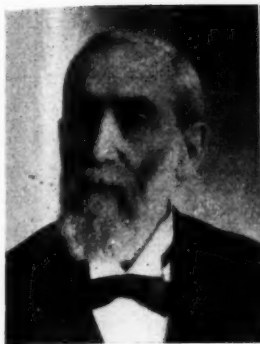
posium on different forms of rheumatism included "Its Pathology," by Dr. A. W. Stinchfield, "Its Symptoms and Diagnosis," by Dr. T. N. Van Cleve, and "Its Treatment," by Dr. A. S. Adams. Does not this remind us of some of the symposiums presented today? "Leucocythemia" was a topic discussed by Dr. W. J. Mayo, in 1898, while Dr. C. H. Mayo presented "Mastoid Disease," which was discussed by Dr. F. C. Todd. In 1899, Dr. J. B. Murphy, an honored guest, opened the discussion of Dr. Charles Mayo's paper, "Some Varieties of Aneurysms," and later presented a paper on "Diagnosis of Abdominal Lesions." "Prophylaxis of Tuberculosis" was presented by Dr. E. E. Bigelow, of Owatonna, and was discussed by Drs. W. J. Mayo, A. F. Kilbourne, Tomlinson, J. B. McGaughey, J. W. Andrews, R. C. Dugan, J. B. Murphy, Chambers, and N. S. Tefft. "The discussion became heated and earnest." Contrast such a program with our didactic type of meetings today.

Any record of this association would be very incomplete if it did not pay tribute to the secretary from 1898 until 1916, Dr. W. T. Adams, of Elgin (photograph). Dr. Adams must have had a keen insight into human nature. The faithful recording of transactions and the résumés of discussions, largely in longhand, add very much to the value of these old records. They reflect well the spirit of the members and of their successful meetings. For example, in 1900, to quote from the minutes: "Dr. Byron Robinson, of Chicago, who was booked for 'Vaginal Hysterectomy,' gave us a talk on the subject in lieu of his paper. The doctor's remarks elicited the most careful attention and received a most thorough discussion, largely from members from the Twin Cities." Dr. Alexander Stone, of St. Paul, opened the discussion, followed by Dr. J. E. Moore, of Minneapolis, and Dr. C. H. Mayo, of Rochester. Again, "Dr. Taylor, of St. Paul, asked to have a resolution passed upon here with reference to the Establishment of a Sanitarium for Tuberculosis by the State."

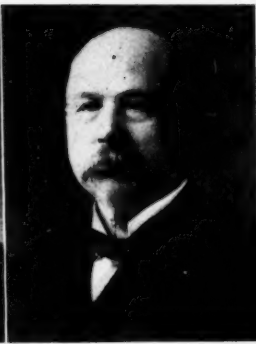
In the business session of 1901:

"Dr. Andrews moved the President say to the W.C. T.U. that we are in sympathy with them. Discussion followed and Dr. Andrews withdrew his motion." "Dr. J. B. McGaughey in his courteous and genteel manner extended an invitation in behalf of the Winona

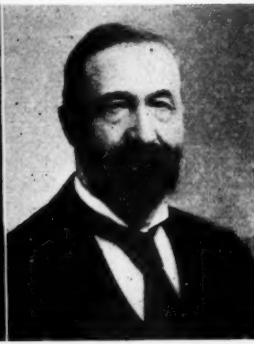
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Dr. Franklin Staples



Dr. H. H. Witherstine



Dr. J. B. McGaughey



Dr. W. T. Adams

County Medical Society for this Association to meet in August, 1903, in the city of Winona. The doctor's remarks were very convincing and the Association unanimously voted to accept the invitation."

Again:

"Pneumonia,' Dr. T. L. Hatch, of Owatonna. Discussion opened by Dr. C. L. Green of St. Paul. Dr. Hatch's paper was well received and showed a very careful study of the subject both in the literature and from the standpoint of practical experience. Dr. Green spoke at length and emphasized the idea that the mortality of pneumonia is greatly influenced by influenza. Dr. Tomlinson entered into a lively discussion on points pathological. He believes a better understanding of the pathology of each case is essential. Dr. H. M. Bracken made a comparison between prognosis of pneumonia and typhoid fever. He thought much depended upon individual characteristics, spoke of controlling temperature with baths, etc., as of prime importance. Dr. C. H. Mayo requested Dr. Hill to give his experience. Dr. Hill said in forty-five years practice in Minnesota he has venesected and given calomel and jalap. He would practice venesections in the plethoric, in the anemic—no. Dr. Hill criticized Dr. Hatch for the great multiplicity of remedies suggested, said, 'We did bleed heroically, perhaps we went too far, but the young man of today may have too many remedies.' The paper was further discussed by Dr. Stinchfield, Dr. Andrews, Dr. Spiere, Dr. Chambers, Dr. Bayley and closed by Dr. Hatch.

"To summarize—The prognosis depends upon the condition of the patient—on the amount of lung and portion of the lung involved, the character of the heart. Some would use digitalis, others discard it, and strychnine was generally mentioned with favor. Bathing to control temperature was spoken of with favor and the method of isolating the patient was generally favored."

At this meeting (1903) Dr. W. J. Mayo's paper called attention to "the fact that there is a tendency for malignancy to follow the irritations caused by the presence of gallstones."

In 1904:

"Heredit' by Dr. R. M. Phelps of the Rochester State Hospital, whose theme seemed to be that 'nature tends to a perfect state,' and Dr. W. J. Mayo, in discussion, referred to tuberculosis; he thinks, 'people who become more recently infected succumb more readily to tuberculosis than those who are inured to the influence of infection, cited the Negro and Indian as examples.' He thinks, 'degenerative diseases, such as cancer, may be hereditary, while infectious diseases, such as tuberculosis, are not.'"

At this meeting Dr. J. G. Cross discussed paratyphoid and Dr. Phelps the Widal reaction.

In 1906 at Winona:

"Reverend Edward Borncamp pronounced the benediction. Before doing so, he read a portion from the Bible which had to do with medicine, which seemed to strike the larger number of the members as a profound surprise, for I doubt if very many present even knew that the medical profession was the subject of special mention in the Sacred Writ."

Throughout Dr. Adams' service as secretary the records are full of interesting comments. The resolution adopted after the death of Dr. Adams reads:

"It is not requisite to the fullest development of sterling character that a man shall pass his years in the turmoil of cities nor vex his soul with further strivings for the high places of the earth. Rather, amid the quiet and solitude of the countryside alone in the daily battle of life, are oftentimes brought to the highest perfection those qualities of self reliance, calm judgment, wise discretion and unflinching courage for overcoming of what difficulties beset the path of him who deals continuously with the weighty matters of life and death.

"And so we record our appreciation of Dr. Adams as one who measured full to the standard of excellence in all relations, and bring our tribute of respect and esteem to the memory of an honorable and upright man."

The records of Dr. Adams as secretary reveal how the early members were willing to step forward and each contribute what he could of experience and knowledge. These individualists, many of whose names are those of the leaders of our profession, all have been coupled with the formative days of our country and with the policies of our medical association; they have helped to build the personality of the Southern Minnesota Medical Association, if you like.

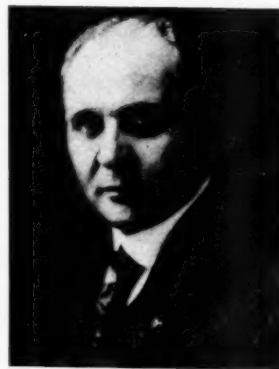
* * *

We come then to the third chapter of our history, the amalgamation of the two associations. The territories and the functions overlapped, and many men were members of both associations. A committee of the Minnesota Valley Medical Association petitioned the Southern Minnesota Medical Association in 1910, stating in effect that the two societies would best serve the larger interest if they consolidated, and asking to carry on as the Southern Minnesota Medical Association. Consequently, a joint meeting was held at Rochester, in 1911, in the forenoon at St. Mary's Hospital and in the afternoon at the Rochester State Hospital, where the business meeting was held and the consolidation effected. The transactions are all fully and carefully recorded in the minutes. The Minnesota Valley Medical Association had existed for thirty-one years and contributed 105 members, while the Southern Minnesota Medical Association was nineteen years old and contributed 115 members. Dr. H. F. McGaughey was temporary president and Dr. A. G. Liedloff temporary secretary. The late Dr. L. A. Fritsche, of New Ulm, was the newly elected president of the amalgamated societies, while Dr. J. E. Crewe and Dr. H. F. McGaughey were vice presidents; Dr. C. F. Merritt was treasurer until his death in 1921, and Dr. W. T. Adams was secretary until he died in 1916.

A significant record made at this meeting in 1911 was of a memoir to Dr. W. W. Mayo, read by his old friend, Dr. Charles Hill. Another significant incident was the reporting, by Dr. Walter E. Sistrunk, of the prevalence of amebiasis in people of this northern climate.

Dr. L. A. Fritsche, of New Ulm, was the first president of the present society, and although he was prevented from presiding at the next meeting by the severe illness of Mrs. Fritsche, he must have known his material when he appoint-

ed the new chairman of the program committee. The society took on renewed energy and growth, and that increased impetus was not permitted to falter, perhaps largely due to the efforts of the



Dr. Aaron F. Schmidt

chairman of the program committee, Dr. Aaron F. Schmidt, of Mankato (photograph). Dr. Schmidt served in this capacity for a number of years and was later designated as secretary-general. It was during this time that the association made its greatest growth and achieved its greatest successes. The programs were elaborate, and, in 1914, the guest speakers included Dr. Bertram W. Sippy, Dr. Dean Lewis, Dr. Allen B. Kanel, Dr. Oliver S. Ormsby, Dr. H. M. McClanahan, Dr. James S. Goetz, and Dr. Arthur D. Dunn. In 1922 the following imposing names were on the program: Dr. William B. Coley, New York; Dr. George E. Shambaugh, Chicago; Dr. Willis E. Campbell, Memphis; Dr. George J. Heuer, Cincinnati; Dr. Walter B. Cannon, Boston; Dr. Judson Deland, Philadelphia; Dr. Fred H. Albee, New York; Dr. M. G. Seelig, St. Louis; Dr. Herman L. Kretschmer, Chicago; Dr. Preston B. Hickey, Detroit; Dr. Nathaniel G. Alcock, Iowa City; and Dr. George V. J. Brown, Milwaukee. In 1914 at Winona, and in 1915 at Red Wing, the afternoon sessions were held on board Dr. Mayo's boat, the "Orinoco," but in June, 1918, the association was prevented from holding its meeting on the boat, because of government restrictive measures on the use of coal during the World War.

During the war many of the members were in service, and their dues were honored by the society; therefore, it became necessary to double

HISTORICAL NOTES—PIPER

the assessment on those who were at home. In 1917 the following resolution was adopted:

"RESOLVED that we, the members of the Southern Minnesota Medical Association, as an expression of our loyalty to our country in the present national crisis, hereby agree to do everything in our power as citizens and physicians, to aid our country in its great struggle for right."

Efforts to expand the influence of the association were successful, and there came a time when it became a threatening rival of some of the larger medical organizations. There was talk of further expansion, but it was seen that such expansion would result, again, in duplication of effort. The Tri-State Medical Association was functioning and the Minnesota State Medical Association was expanding its influence. Some of the wiser heads of our association felt that it might be going beyond the limits of its intents and purposes and counselled that it be what its name implied, The Southern Minnesota Medical Association. In 1919, at Mankato, Dr. W. J. Mayo remarked as follows:

"Dr. Andrews has said that the association is equal to, if not greater than, the state association. I want to say to you, members of the Southern Minnesota Medical Association, that this should not be true; that every man who is here is potentially a member of the state medical association, and he should attend the meetings of the state medical association as the representative body of the state. After all, we are a local society, but we have very great traditions."

Traditions we still have as precedents. At the first meeting after the amalgamation, in Mankato, there occurred an incident relative to one of those individualists who was greatly respected. It was recorded as follows:

"In 1912, at the opening of the afternoon session, some one expressed a regret that Dr. Z. G. Harrington was not present and it was explained that the doctor felt somewhat aggrieved that the old Minnesota Valley Medical Association was dissolved, and, to express to Dr. Harrington the true feeling of the newly organized Southern Minnesota Medical organization, a committee was sent to bring Dr. Harrington to the hall and introduce him to the Association. The doctor came with his escort and, at an urgent request, made a few well-chosen remarks that showed the great heart of the speaker, that while the dissolution of the old society was a sore grievance to him, he did not want to stand in the way of that which is believed by his friends to be for the betterment of the profession. A few minutes were taken for members to shake hands with the venerable physician."

In the past twelve years, which might be said to be the subject of the fourth chapter of this record, the effort on the part of your officers has been to be of as great service as possible



Dr. Z. G. Harrington

to the members. Programs have never lacked in excellent material, and those who have attended the annual meetings have felt that the days have been well spent. In 1929 the afternoon program was presented on board the Strekfus Excursion Steamer, the "Capitol," carrying 368 members and guests. In 1917 and again in 1933 the association was invited to conduct a meeting in Minneapolis as guests of the Hennepin County Medical Society, and in 1919 it was invited to Clear Lake, Iowa, but the Executive Committees have always found it more expedient to convene in the home communities.

About 1921 there was a deficit in the treasury and members had to "dig down" to make it up. In 1920 business houses of Mankato contributed \$605 for expenses of the association. In 1926, there was \$920 in the treasury, and last year our cash resources were slightly more than \$4,000.00. Since 1892 the Association has met in Mankato sixteen times, in Rochester twelve times, in Winona eleven times, in Owatonna seven times, in Faribault three times, and once each in Albert Lea, Austin, Fairmont, Red Wing, and New Ulm. There have been twenty-one two-day programs, the last one of which was held in Rochester in 1928. In 1929 the association adopted the suggestion of Dr. Waltman Walters that a suitable medal be offered to that senior medical student at the University of Minnesota who should be selected by a committee of the faculty. The selection of the student was to be based on

HISTORICAL NOTES—PIPER

his proficiency in the fields of medicine and surgery during his senior years. Also, it was decided to award another medal for excellence of a scientific exhibit at the annual meeting of the

Fritsche, Dr. J. H. James, Dr. A. B. Stewart, Dr. H. F. McGaughey, Dr. F. A. Dodge, Dr. E. S. Judd, Dr. A. F. Schmidt, Dr. M. S. Henderson, Dr. John Williams, Dr. H. Z. Giffin, Dr.



Dr. J. W. Andrews

Dr. C. H. Mayo

Dr. W. J. Mayo

Minnesota State Medical Association. These have been awarded annually. For three years there has also been issued a second award of \$100 to a senior medical student of the University of Minnesota. This student has been selected by the same committee of the faculty which makes selection of the recipient of the medal. A medal also has been presented to that participant in our own programs whose offering in the judgment of the president's committee has the greatest merit.

This year an award is added for the best case report presented by some member of the association. It is to be hoped that these awards may stimulate greater effort.

In mentioning the names of those who have contributed so largely to the success of the society there are, first, the presidents: Dr. Franklin Staples, Dr. H. T. McGaughey, Dr. Charles Hill, Dr. N. S. Tefft, Dr. S. W. Ransom, Dr. H. H. Witherstine, Dr. J. H. Adair, Dr. E. D. Keyes, Dr. A. S. Adams, Dr. J. P. Waste, Dr. Christopher Graham, Dr. A. B. Stewart, Dr. R. C. Dugan, Dr. A. L. Baker, Dr. C. O. Cooley, Dr. O. F. Way and Dr. T. L. Hatch. At the time of amalgamation of the two associations, in 1911, of these, Drs. Kilbourne, Graham, Stewart, and Way were living.*

Subsequent presidents have been Dr. L. A.

W. J. McCarthy, Dr. W. F. Braasch, Dr. F. P. Strathern, Dr. H. W. Meyerding, Dr. F. R. Huxley, Dr. H. T. McGuiggan, Dr. J. S. Holbrook, Dr. E. H. McLaughlin, Dr. Waltman Walters, Dr. J. T. Schlesselman, Dr. Charles C. Allen, Dr. R. V. Williams.

The roster contains about a thousand names.

There have been only six secretaries: Dr. H. H. Witherstine, Dr. W. T. Adams, Dr. H. Z. Giffin, Dr. H. T. McGuiggan, myself and Dr. Habein.

Traditions of the past may influence the trend of the future. Although this association was originated for the interchange of professional experiences and ideas among its members, the requirements of today perhaps suggest the gathering for round-table discussion more than classroom instruction. An effort has been made today to foster discussion and to encourage participation in the symposiums on symptoms in the morning sessions. Further use of this type of program may be made in the future if it meets with favor. Because of ease of modern travel, it might be desirable to have two or three afternoon meetings, permitting members to return home at night, attend to their patients in the morning, and reconvene in the next afternoon for the program. The last afternoon might be devoted to lectures by distinguished guests and a grand rally at the evening banquet.

Your officers and committees welcome helpful

*Drs. Graham, Stewart and Way are still living. Dr. Kilbourne has died since this article was read.

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criticism and suggestions. The members of this association have always been ready and willing to lend helpful suggestions or to give timely warnings. There come to memory the names of many who have been of most valuable assistance, through the years of the association's existence. The interest of such men, behind such an organization, speaks surely for its large influence on the medical profession. Such names as the following seem closely associated with the Southern Minnesota Medical Association: A. M. McLaughlin, E. S. Judd, W. J. Cochrane, F. A. Dodge, W. P. Freligh, J. W. Andrews (photo-

graph), J. S. Holbrook, D. F. Hallenbeck, A. M. Snell, A. B. Stewart, H. T. McGuiggan, H. W. Meyerding, Harold Habein, F. R. Huxley, W. H. Valentine, Waltman Walters and P. F. Holm.

And, of course, there have always been before us the names of two men who have cherished our progress as we have learned to cherish their wisdom, who have never held office, who have always willingly contributed to the programs and responded with valuable aid and advice when requested, who have perhaps furnished our highest inspirations, Dr. William J. and Dr. Charles H. Mayo.

INFLUENCE OF GASTRIC LAVAGE ON FAMILIAL AND NON-FAMILIAL ERYTHREMIA*

JOHN FRANCIS BRIGGS, M.D.

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and

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St. Paul

A GREAT deal of evidence has accumulated in the past few years to indicate that the stomach is capable of secreting a hematopoietic substance. The manner in which this material is formed or the method by which it acts upon the blood-forming organs is still a matter of controversy. It must suffice that we accept the experimental evidence as demonstrated, and await further work in determining the rôle of gastric physiology in hematopoiesis. It is interesting, however, to speculate as to the relationship that may exist between gastric disturbances and the development of blood dyscrasias.

In general the evidence to date suggesting the ability of the gastric mucosa to form a hematopoietic material is based upon the studies of gastric physiology in pernicious anemia and the development, clinically, of an addisonoid anemia in gastrectomized individuals.

The absence of free hydrochloric acid in the gastric juice of patients suffering from pernicious anemia has long been known,¹⁰ as has been the fact that in pernicious anemia the stomach is not capable of secreting free hydrochloric acid.¹

Further observation has shown that the achlorhydria may exist for many years before the appearance of those hematological characteristics peculiar to pernicious anemia.¹⁸ The achlorhydria found in carcinoma of the stomach is not only associated with blood changes simulating pernicious anemia, but also with changes that are definitely characteristic of pernicious anemia.² As a result of the abnormal gastric findings in pernicious anemia, many observers suggested that these changes in gastric physiology may be of etiological significance in pernicious anemia.^{4,6} In contrast to the observations that an achlorhydria always exists in patients suffering from pernicious anemia, are those observations revealing the development of an addisonoid anemia where disease or operative procedures have altered gastric physiology. Pernicious anemia has been found associated with gastric polyposis²⁰ and it is suggested that in this instance the polyposis was the cause of the pernicious anemia. The influence of gastrectomy upon hematopoiesis is widely recognized. Hartman,⁸ Moynihan,¹⁷ Dennig,⁵ and Hurst⁹ have reported the development of an addisonoid anemia in individuals subjected to total gastrectomy, and re-

*Read before the Central Society of Clinical Research, November 4, 1934.

cently Goldhamer⁷ has reported an additional case of this type of anemia, as well as reviewing those cases already reported. It is worthy of note that the Addisonoid anemia following total gastrectomy reacts in exactly the same manner to liver therapy as does the true case of pernicious anemia.^{4,7}

Castle⁸ by a series of brilliant experiments was able to prove that the gastric mucosa did play a definite part in the formation of a substance capable of hematopoiesis. He also demonstrated that this particular function is absent in those patients suffering from pernicious anemia. He concluded that an intrinsic factor is secreted by the normal gastric mucosa which combines with an extrinsic factor in the food to form a hematopoietic substance.

Morris¹² believes that the hematopoietic substance present in the gastric juice in normal individuals is a hormone, and he has been able to isolate this particular substance from the normal gastric juice, and has suggested that it be named Addison. He also believes that in pernicious anemia this hormone is absent, and that pernicious anemia represents a state of an Addisonism.¹⁵ The intramuscular injection of the substance Addison has proven efficient in bringing about remissions in pernicious anemia.^{12,13,14,15,16} Ederle has shown that an extract of hog gastric mucosa when injected daily is also effective in the treatment of pernicious anemia.⁶ Morris has suggested a hypothesis that inasmuch as polycythemia vera has many features of antagonism to pernicious anemia, that polycythemia vera may well be a condition in which the hormone Addison is present to excess.^{11,15} The erythremic type of polycythemia vera, in contrast to the erythrocyte form, which is a compensatory phenomenon, does show, during its course, alterations in the blood picture, indicating a stimulation of the blood forming organs. Heretofore this spontaneous increase in blood formation was considered to be of idiopathic origin. It seems possible, however, that these changes that occur in the blood picture of erythremia represent the influence of a hormone acting upon the blood forming organs. Following the suggestion of Morris that erythremia might be the result of hyperaddisonism, it was thought that gastric lavage might remove the hormone Addison in sufficient amount to relieve the erythremia. Such an observation was made by Tuchfield²¹ in a

patient with a duodenal ulcer and erythremia. He noted that frequent lavage of the stomach to relieve the ulcer pain also alleviated the erythremic symptoms. We felt that should this hypothesis be correct, then the feeding of expressed gastric juice of the erythremia should be effective in bringing about remissions in pernicious anemia. We also felt that this should result without the incubation of juice with beef or the use of those various means of preparing the juice as has been done heretofore. In order to eliminate the possibility of the erythremic juice interacting with purine bodies in the diet, thus forming a hematopoietic substance, the erythremic patient was placed on a low purine diet. The patient was then subjected to routine gastric lavage four to six times daily, with the time of the lavage being varied from day to day in a further attempt to eliminate the dietary factor in hematopoiesis. Under these conditions, the following observations were made in an individual suffering from erythremia.

Mrs. V., white, housewife, forty-two years of age, was admitted to the medical service at the Ancker Hospital in July, 1933. At the time of admission she complained of attacks of weakness and blurring vision. Since April, 1933, she had been suffering from recurring attacks of weakness and dizziness. Associated with these attacks were headaches of severe nature. These headaches were generalized and would occur at any time during the day. There was, however, no relationship between the headaches and events during her daily life. At times her eyes would blur, and she would have a transitory diplopia. She had accidentally discovered a mass in the upper left quadrant of her abdomen a few months before her admission to the hospital. The past history was of no importance to the present condition, and no members of her family suffered from polycythemia. There was no evidence that her present condition had any association with past events or occupations in her life. Only those physical findings relative to her present condition will be reported.

On physical examination the patient presented a striking appearance of a cyanosis. Examination of the eye grounds revealed a moderate choking of both discs. Cardiovascular examination revealed a systolic apical murmur with a mild degree of cardiac hypertrophy. Her blood pressure was 200 millimeters of mercury, systolic, and 140 millimeters of mercury, diastolic. There was no evidence of cardiac decompensation. The tumor mass, recognized by herself, was an enlarged spleen. The patient was disorientated and confused. She was bedridden and unable to be of any assistance to herself. Nothing on physical examination could be found to suggest that the condition might be an erythrocytosis, rather than an erythremia. Labora-

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ERYTHREMIA—BRIGGS AND OERTING

tory examination showed the urine to contain varying amounts of albumin from day to day; urine examination was otherwise normal. Examination of the spinal fluid showed nothing of note, and the blood Wassermann test gave negative findings. The basal metabolic rate was plus seven. Blood chemistry studies were within normal range. The sedimentation rate, bleeding, and clotting time, as well as the icterus index, were within normal range. Fragility tests were normal. Under gastric lavage, blood examinations were as follows:

TABLE I

Date	Hb.	R.B.C.	W.B.C.	Retic.	
7-21-33	115	6.6	10,150	4 %	Lavage
8-6-33	94	5.5	11,750		Lavage stopped
8-22-33	98	6.4	12,150	1 %	
8-23-33	105	6.24	17,500	3 %	Lavage started
9-1-33	94	5.8		1 %	
10-2-33	98	6.25			
10-3-33	99	5.9			
10-6-33	98	5.62			Lavage stopped
10-17-33	108	6			
10-23-33	98	4.98		1 %	
10-27-33	100	6.11		2 %	Lavage started
10-29-33	93	6.1		1 %	
10-31-33	98	5.5			
11-2-33	98	5.8			
11-8-33	92	5.7			
11-11-33	90	5.6			
11-12-33	92	5.7			
11-13-33	88	5.1			
11-15-33	55	5.25			
11-19-33	90	5.26			
11-23-33	90	5.26			
11-24-33	94	6.8			Stop lavage
11-27-33	100	6.9		1 %	
11-30-33	108	7.5	21,550		Lavage started
12-1-33	108	8.3		4 %	Juice obtained
12-2-33	100	7.9	19,000		
12-3-33	90	7.0	16,100		Lavage stopped
12-4-33	117	7.7	20,800		
12-5-33	115	7.75	21,250	1.1%	
12-7-33	123	7.86	15,500		
12-11-33	122	8.85	18,250		
12-13-33	129	10	23,500	1 %	Phenylhydrazine
12-15-33	117	7.3	17,400	1 %	Liver given
12-21-33	70	4.05	23,000	4.6%	
12-23-33	58	3.4		12 %	
12-26-33	46	2.4	25,250	17.6%	
12-27-33	43	3.2		12 %	
12-28-33	40	2.4		10.9%	
12-29-33	44	2.64			
12-30-33	48	2.1		7.6%	
1-2-34	56	3.2	10,650	12.3%	
1-9-34	60	3.55	9,800	8.9%	Liver stopped
1-11-34	61	3.32		6 %	
1-14-34	64	3.8	10,800	5.2%	
1-18-34	67	3.8			
1-24-34	62	3.7		3.3%	
1-28-34	105	8.8		1 %	

The patient at the time of admission suffered a good deal from mental confusion. Shortly following admission the patient was subjected to gastric lavage, as noted in Table I. Under this type of treatment, her cyanosis and mental symptoms disappeared, and the patient was able to be up and around in the ward, and of sufficient health to aid in the ward duties. All dizzy spells and headaches ceased with the gastric ex-

pression, and the blood picture dropped to lower limits. As soon, however, as lavage was discontinued, the patient became worse. The cyanosis returned, as did the dizziness and headaches, and the blood picture returned to higher values. The blood pressure readings changed with her periods of induced remission, but to such a moderate degree that they do not warrant recording. At will, we were able to alter the patient's condition by gastric lavage, until December 3, 1933, when lavage was stopped. Histamin and alcohol failed to stimulate the gastric mucosa, and the patient developed an exacerbation of her erythremia when lavage was stopped. The symptoms returned, and she was again confined to bed. On December 13, 1933, phenylhydrazin was given and was carried over into toxic doses. The blood picture returned to subnormal range, and 2 cubic centimeters of liver extract was administered intramuscularly each day. The blood picture improved rapidly with reticulocyte counts reaching 17.6 per cent. After liver therapy was stopped in January, 1934, the patient still continued to regenerate blood cells. The speed of the regeneration simulated the reaction of pernicious anemia to liver treatment.

The expressed gastric juice, as it was obtained from the erythremic patient, was normal to chemical analysis and this gastric juice was used to treat two patients suffering from pernicious anemia. The expressed juice was used as it was obtained from the polycythemic stomach. It was not concentrated, and no preservatives were added. The stomach contents were given to the pernicious anemia patients through a duodenal tube, and the average daily amount administered was two hundred and fifty centimeters, of which fifty centimeters was actually gastric juice, and the rest normal saline used in the irrigation. These two patients who received the gastric juice were on regular diets and no other therapy was given to them. Results of this experiment were as follows:

Mr. N., aged seventy-five, a retired white man, was admitted to our service at the Ancker Hospital on July 30, 1933. Mr. N. complained of weakness, vomiting, diarrhea and edema of the ankles. Four years before, he noticed a beginning edema of both ankles. He consulted a physician who gave him medicine which resulted in a temporary recovery from his symptoms. He felt well for one year, when his symptoms returned, and a second physician told him he was suffering from a carcinoma of the stomach. Without treatment, his symptoms disappeared. During the following three years his story is one of alternating well being and ill health. About one week before admission, his symptoms recurred, and he was referred to the hospital. Examination revealed a well developed, fairly well nourished white male of peculiar lemon color. Temperature, pulse, respiration, and blood pres-

sure were all normal. His skin was definitely of lemon tint, and his tongue was smooth. In addition a tumor mass was palpated in the epigastrium, which was superficial in position, and was apparently a desmoid. There was loss of vibratory sensation over both ankles. Laboratory examination revealed a hemoglobin of 58 per cent, red blood count 2,800,000, and white blood count 3,250. Differential count revealed a relative lymphocytosis as well as those changes characteristic of pernicious anemia. The Wassermann findings were negative, and the icterus index was twenty-five. Analysis of the gastric juice showed no evidence of free hydrochloric acid on repeated examination. Urine examination was normal. Basal metabolism was plus five. Complete x-ray examination revealed no evidence of gastric malignancy. This patient received 250 centimeters of the erythremic gastric juice daily, with the following response in the blood picture.

Date	HB	R.B.C.	W.B.C.	Retic.
7-31-33	58	2.8	3,250	
8-11-33	60	2.0	7,500	4%
8-15-33	70	2.6	4,800	2%
8-20-33	62	2.7	7,200	
8-25-33	64	2.9	7,000	
8-31-33	68	3.4	7,000	5.5% Stopped
9-23-33	69	3.7	5,900	

This patient, suffering from pernicious anemia, made an excellent response to the ingestion of gastric juice. There was no other therapy given to the patient during this experiment. The treatment was continued from August 2, 1933, to August 31, 1933. The original complaints, that brought him to the hospital, had disappeared, and he was able to return to the out-patient department for routine care.

On November 14, 1933, Mrs. M., aged sixty, was admitted to our service because of diarrhea and abdominal pain of twelve days' duration. She gave a long history of many illnesses, unrelated to the present disease, the outstanding story being one of repeated treatments for a chronic edema of the left leg. It was developed later that this edema followed a phlebitis that occurred in her youth. Twelve days before admission, the patient noticed abdominal pain of cramp-like nature, that was followed by diarrhea. This had been so severe that she was finally hospitalized. Physical examination revealed a well developed, well nourished white female, who was not acutely ill. Her skin was deep yellow in color, and her tongue was typical of pernicious anemia. The rest of the examination was negative, except for a chronic edema of the left leg. Pulse, temperature, respiration and blood pressure were within normal limits. Laboratory examination revealed a hemoglobin of 36 per cent, red blood count of 1,600,000, and white blood count was 4,500. Cellular morphology was typical of pernicious anemia. The Wassermann findings, urine examination, and blood culture, were normal. Icterus index was 19. Stool examinations were normal, and examination of the gastric juice revealed the absence of free hydrochloric acid. On November 19, 1933, she was given 250

centimeters daily of the erythremic juice with the following response in the course of her disease.

Date	Hb.	R.B.C.	W.B.C.	Retic.	
11-19-33	38	1.6	4,550	0	
11-22-33	40	2.0	3,150		
11-23-33	50	2.0	4,100	0	
11-26-33	48	1.9	5,850	6%	
11-29-33	44	1.9	5,050		
11-30-33	54	2.1	4,700		
12- 3-33	64	2.2			Out of juice Liver given 2 c.c. intra- muscular
12- 5-33				1.2%	
12- 7-33	52	2.2	5,100	6.7%	
12-11-33	55	2.2	5,950		
12-12-33	55	2.4	6,400	3.4%	
12-15-33	52	2.1	9,650	2.8%	
1-14-34	67	3.2	12,000		Patient de- veloped upper respiratory infection

The general appearance of the patient improved upon ingestion of the gastric material. Her appearance became better, and the patient felt relieved of the symptoms that caused her admission to the hospital. On December 3 our supply of gastric juice was depleted, and 2 centimeters of intramuscular liver was given daily in place of the juice. The patient's progress was hindered for a time because of the development of an upper respiratory infection, but under liver treatment she continued to improve.

It was apparent that in this particular case of erythremia, gastric lavage seemingly removed some substance capable of stimulating blood formation. It was difficult, however, to believe that this mechanism was present in those individuals suffering from the familial type of erythremia.

Spodaro¹⁰ has recently given an excellent review on the subject of familial polycythemia vera and brings the total number of cases of this disease down to date. It has been felt by us that in this particular type of erythremia the blood change is not the result of an excess hematopoiesis, but rather represents a failure of the organisms to destroy red blood cells. Thus familial erythremia would represent the antagonistic syndrome to familial jaundice. This supposition is purely hypothetical and lacks proof at the present writing.

Through the courtesy of the Wilder Dispensary, Mr. Q. was referred to us to study the effect of gastric lavage upon erythremia. After admission it was found that many members of his family were suffering from the same disease, and blood studies made upon relatives now living reveal that many of them are suffering from erythremia. Mr. Q. was a white man, forty-seven years of age, who was admitted to our service

on January 26, 1934. He complained of headaches and dizziness which had been present for many years. He was apparently well until one year ago, when people began to remark about the increasing ruddiness of his complexion. Dizziness and ocular disturbances became worse at the same time, and occasional throbbing headaches would disturb his vision. Because of the increase of these symptoms, he was sent to the Wilder Dispensary, where it was discovered that he was suffering from polycythemia vera. He was placed on phenylhydrazin therapy with fair success until the past few months, when he found he was unable to tolerate the drug any longer. His past history, occupation, and habits were in no way connected with the present illness.

Family history: His father died of a stroke at the age of sixty-two. His mother is now living and well. He stated that practically all members of his family—by this he meant his brothers and sisters—had the same type of ruddy complexion as he had himself.

Laboratory examination: Urine was normal to routine examination. Blood Wassermann examination, icteric index and blood chemistry were normal. X-ray examination showed no evidence of any existing disease. At the time of admission his hemoglobin was 137 per cent, red blood count 8,280,000 and 7,000 white cells. Under gastric lavage the white blood count, red blood count, and the hemoglobin varied from that at the time of his admission, to the highest two weeks after admission with a hemoglobin of 152 per cent, 9,270,000 red blood cells, and 7,250 white blood cells. The reticulocyte count never exceeded 1.2 per cent at any time. At one time there was a spontaneous decrease in the blood picture, during which time the hemoglobin fell from 150 to 134 per cent, and the red blood count from 9,250,000 cells to 7,800,000. Fragility test at the time of admission revealed hemolysis beginning at 0.36 and complete at 0.28. At the time the drop in blood picture occurred spontaneously, hemolysis began at 0.48 and was complete at 0.32 as compared to normal hemolysis beginning at 0.48 and complete at 0.32. The icterus index at this time became elevated to twenty degrees. Bleeding and clotting time, as well as sedimentation rates, were normal. The basal metabolism rate was normal; and gastric expression was normal. The patient had no marked decrease in his blood picture as a result of a gastric lavage, except that when gastric lavage was stopped, and he was no longer obtaining any therapy to decrease the red blood count, his hemoglobin rose to 160 per cent, his red blood count to 10,200,000 and his white cell count to 9,500. One brother was found to have a hemoglobin of 105 per cent with 5,840,000 red blood cells and 7,200 white cells. Another brother was found to have a hemoglobin of 130 per cent and a red blood count of 5,520,000, and a white count of 6,250. A third brother had a hemoglobin of 113 per cent, red blood count was 5,900,450, and 6,750 white blood count. The fourth brother was found to have a hemoglobin of 126 per cent, red blood count 5,730,000 and a white count of 10,400. The fifth brother was found to have a hemoglobin of 105 per cent, red blood count of 5,840,000,

and a white count of 9,200. Two sisters, who are living out of town, have been investigated and found also to be suffering from erythremia. We were unable, however, to obtain the value of the hemoglobin and red blood counts in these instances. The ages of his brothers vary from thirty-six to forty-five years of age.

Gastric lavage apparently had no effect upon lowering this man's blood picture, except that when it was stopped the value of the various constituents of the blood reached higher limits. While undergoing lavage, the patient always felt better and had little trouble with dizziness and his usual subjective complaints. An interesting observation was made in that the reticulocyte counts were never excessive, and that spontaneous decrease in the red blood cells and the hemoglobin was followed by an elevated icterus index. In addition the white blood cells of the patient and his family were always normal, suggesting a lack of white blood cell stimulation.

Observation suggested that during the time of the elevation of the red blood cells and of the hemoglobin, some alteration in the fragility of these cells had occurred, and that hemolysis was unable to occur. It suggested to us that with the persistence of a stable reticulocyte count there was no great influence brought to bear upon the blood forming organs by a hormone, but rather that the increase in the blood constituents was the result of his inability to destroy red blood cells, and that the difficulty was one of increased cell resistance rather than of increased blood formation.

Conclusions

1. Evidence has been presented to indicate that the stomach is capable of secreting a substance that has hematopoietic power.
2. Lavage of the stomach in a case of erythremia resulted in an improvement of the clinical symptoms with a decrease of the individual cell constituents of the blood.
3. The administration of the untreated erythremic gastric juice to two patients with pernicious anemia, brought about clinical and hematological remission in their diseases.
4. One case of familial polycythemia is reported in which lavage failed to lower the constituents of the blood, but prevented these constituents from increasing to higher levels.

5. It is suggested that erythremia is the result of an excessive formation of the hormone addisin, and represents a condition of hyperaddisinism, and that pernicious anemia represents the antagonist of this disease, in which there is an absence of this gastric hormone, or an addisinism.

6. It is also suggested that familial erythremia represents a disease in which there is a disturbance in the factor of hemolysis of red blood cells and that some alteration of this phenomenon is the etiological factor in producing the disease.

7. It is also suggested that familial polycythemia vera may represent the antagonistic phenomenon to congenital familial jaundice.

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IDIOPATHIC HYPOCHROMIC ANEMIA*

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SINCE 1554 when Johannes Lange⁹ described chlorosis using the term "De Morbo Virgineo," and 1822 and 1826 when James Combe¹⁰ and Thomas Addison,¹¹ respectively, described the condition which was later to be called pernicious anemia, until recent years it has been customary to classify anemias broadly as pri-

mary and secondary. The former included those whose cause was unknown or in doubt and was typified by a blood picture in which the red cells were reduced out of proportion to the hemoglobin, yielding a color index, therefore, greater than unity. The secondary type was characterized by a reduction of hemoglobin out of proportion to the red blood cell reduction and with a color index less than unity. After 1877 when

*Read before the Northern Minnesota Medical Association, Brainerd, Minn., September 10, 1934.

Samuel Fenwick added to our knowledge of pernicious anemia by demonstrating achlorhydria in patients suffering from this type of anemia, it soon became universally accepted that achlorhydria was essential to the diagnosis of an anemia of the Addisonian type. However, when Castle and his co-workers² demonstrated a constant lack of an intrinsic or extrinsic factor, as the case may be, in pernicious anemia and its related anemias a complete revision in the classification of anemias was necessary. Faber⁶ called our attention to the existence of an anemia, which was not pernicious anemia, but which was accompanied by an achlorhydria or hypochlorhydria. With the knowledge that some anemias are characterized by an achlorhydria or hypochlorhydria, we are therefore entitled to classify anemias today as achlorhydric or deficiency anemias and non-achlorhydric or non-deficiency anemias. Into the latter group will fall such anemias as those due to blood loss from hemorrhage, malignant disease, nephritis, toxemias, infectious disease, etc. The former group may in turn be divided into two broad classes, the first including pernicious anemia and its related anemias, and the second including a type characterized by hypochlorhydria or achlorhydria, a low color index, a low icteric index and which responds to inorganic iron therapy. This we have chosen to term idiopathic hypochromic anemia.

The latter type of anemia has had a multiplicity of names, including achylia chloranemia, chronic hypochromic anemia, simple anemia, simple hypochromic anemia, simple achylic anemia, microcytic anemia, chronic chlorosis, achlorhydric anemia and primary hypochromic anemia. It is important that with this maze of terminology we do not confuse ourselves, but that we remember all are one and the same disease entity. As suggested previously it was only early in this century that achlorhydria had been associated with an anemia other than the Addisonian type. Subsequently Vinson¹⁷ after the work of Patterson¹⁵ and Kelly⁸ described a type of dysphagia which was associated with anemia and achlorhydria. Since that time, and especially since Castle's work,² there has been an increasing amount of attention paid to this syndrome.

Contrary to the usual procedure it seems best to first describe the signs and symptoms and then the etiology. The patients are usually wom-

en who present themselves during the fourth or fifth decade of life with a chief complaint of weakness, anemia, peplessness or "being all tired out." In Witt's¹⁸ classic description he presents fifty cases, forty-nine of whom were females, with an average age of thirty to fifty years, but with no racial predilection. The patients may also state that friends have told them they are pale, and that they become dyspneic upon slight exertion. They tire easily and may often note that the tongue has been sore. At times they may complain of paresthesias and of various digestive disorders such as anorexia, diarrhea or constipation. Often there is menorrhagia and frequently this may be taken as the cause of the anemia. In brief, then, the patients' symptoms may be divided into the anemic and digestive types. If one delves further into the history he will find that the patient has subsisted, in many instances, upon a diet characterized by a paucity of meat, green vegetables and fresh fruits, but with a high carbohydrate element. The diet, then, though ample in caloric value, has been deficient in hemoglobin building foods.⁴

To physical examination the patient more often than not appears to be well nourished. The skin is definitely pallid, not the classical lemon yellow tint of pernicious anemia nor the historical green of chlorosis, but has a "washed out" appearance not unlike the sallowness one sees in certain types of nephritis. The conjunctivæ and scleræ fail to show any icterus, but are instead pale and the latter often have a blue sub-tint. The tongue is frequently of the atrophic or bald type. Examination of the cardiovascular system reveals findings compatible with the degree of the existing anemia which are familiar to all of us. One particularly interesting feature is the brittle or so-called spoon nail. This is a finding practically diagnostic of this type of anemia. The spleen is often palpable, though usually not greatly enlarged.

The history and physical findings, with few exceptions, are therefore found to be not unlike those of pernicious anemia. Consequently we must turn to the laboratory to evolve a correct diagnosis. Gastric analysis reveals that achlorhydria occurs in the greater number of cases, although, as in pernicious anemia, there may sometimes be hypochlorhydria. More detailed examination will reveal an excessive amount of mucus and a diminution in the amount of pep-

sin.⁵ The icteric index is found to be low or within the limits of normal. Examination of the urine does not often show the presence of urobilinogen. The most important procedure, the examination of the blood, shows a moderate reduction in the number of red blood cells and a proportionately greater reduction in the hemoglobin, thus yielding a color index less than unity. In the more advanced cases, the red blood cell count may be reduced to two or three million with a hemoglobin of thirty or forty. As a rule, however, the red blood cells average from three and a half to four million and the hemoglobin about fifty. The white blood cells are usually moderately reduced, but without the neutropenia which so frequently occurs in pernicious anemia. Microscopically the blood smear reveals a small red cell, which is hypochromic and uniform in shape. Occasionally there may be normoblasts, but on the whole there will be none of the characteristics of the pernicious anemia smear with marked variation in size and shape, normoblasts, reticulocytes, and the "old man" polymorphonuclear cell. Examination of the bone marrow from a patient with hypochromic anemia reveals a preponderance of erythroblasts, not the megaloblasts one finds in pernicious anemia. We thus have an erythroblastic type of anemia. We now have before us the picture of a patient suffering with idiopathic hypochromic anemia.

It has been found that this type of anemia responds well to inorganic iron, but not to liver. This response indicates a defect in the ability of the individual to utilize organic iron.⁵ Dameshek³ feels that there is an inadequate response on the part of the stomach and a failure to properly digest organic iron, leading to poor hemoglobin formation and defective maturation of the erythroblast. He feels this condition to be made worse or intensified by an insufficient diet, dysphagia and such conditions as pregnancy, myxedema, chronic blood loss and intestinal parasitism. Mettier and his confrères¹² have found that patients with this disease respond to large doses of inorganic iron, but do not respond to a diet wealthy in organic iron. However, upon feeding a predigested meal rich in organic iron and possessing an acid reaction, they obtained a satisfactory response in blood and hemoglobin. They therefore believe that idiopathic hypochromic anemia is due to an iron deficiency brought

about by a gastric dysfunction which results in a failure of the use of organic iron. It would therefore appear that in hypochromic anemia we are dealing with a deficiency disease, in which because of deficient gastric ability to handle organic iron there is a lack of iron absorption and therefore a reduction in hemoglobin and a depression in the maturation of the erythroblasts.

Because of the frequent occurrence of menstrual disturbances some authors have believed there to be a relationship between menstruation and this type of anemia.¹ However, when one considers that this anemia occasionally does occur in the male and that it has been definitely associated with an iron deficiency, the menstrual relationship does not seem plausible. Dameshek,³ quoting Suzman, states that there is hyperkeratinization of the epithelium of the tongue, hypopharynx and esophagus in the so-called Plummer-Vinson syndrome and that this is a manifestation of iron deficiency brought about by gastric dysfunction. Davies⁶ also feels that these findings as well as the brittle finger nails are signs of iron deficiency and therefore anemia with resultant trophic changes. The latter author, with others, has found a number of patients with idiopathic hypochromic anemia who at an earlier date have had gastric operations, such as gastric resections and gastro-enterostomies, with slowly developing gastric dysfunction and anemia. This latter condition emphasizes the theory of gastric deficiency with faulty iron absorption as the etiology of the anemia.

Hypochromic anemia, as well as pernicious anemia, may occur in pregnancy. As gastric inability to utilize organic iron may occur in varying degrees, i.e., it may be relative or absolute, it is more likely that when the presence of the fetal organism exerts an increasing demand for iron, there is an inability on the part of gastric function to meet the demand of the two organisms and therefore anemia results.

One should not pass over the subject of idiopathic hypochromic anemia without reference to its relationship to pernicious anemia. Heath⁷ is one of the numerous observers who have found both conditions with achlorhydria existing in the same family. Nor should one forget the previously mentioned but almost forgotten and seldom seen chlorosis. The question arises, is this one and the same disease? On the one hand chlorosis occurred in young girls at the age of

puberty, the skin was greenish in hue, the appetite was capricious, and there was hyperchlorhydria; while in idiopathic hypochromic anemia we find the age to be somewhat older, the skin is not of greenish tint and there is either a hypochlorhydria. However, both respond to iron therapy. Bloomfield¹ believes that menstrual disturbances may be a cause common to both. Stockman¹⁶ does not believe the two are related, but that chlorosis occurred in young girls whose dietary was faulty and who immediately responded to a diet rich in iron. The latter factor would seem to indicate that the two are not the same, for patients with idiopathic hypochromic anemia do not respond to diets rich in iron without the inorganic substance being present.

The treatment of hypochromic anemia has already been alluded to, namely, inorganic iron, in large quantities. Nowadays it is customary to give from 60 to 120 grains of iron daily. This may be given in various forms. The favorite of many is iron and ammonium citrate, usually prescribed in aqueous solution. Reduced iron in doses of 60 to 80 grains daily is of value. Saccharated ferrous carbonate in twenty grain doses four times a day in capsules, is particularly effective. In prescribing the various iron compounds it is important to remember that it is essential to supply at least one gram of metallic iron daily and that the iron content of the different preparations varies. Reduced iron contains 78 per cent, iron and ammonium citrate 17 per cent and saccharated ferrous carbonate about 60 per cent. The diet should be a highly nutritious one and should contain an abundance of meat, fresh fruits and vegetables. Opinion varies as to the advisability of prescribing hydrochloric acid. Witts feels that it has no effect upon the anemia but that it does benefit the digestive symptoms. The work of Mettier and Minot¹³ would indicate that a better response to iron is obtained when it is administered in a medium of high acidity. To me, hydrochloric acid seems to be beneficial in giving a more rapid response to therapy. When one does prescribe dilute hydrochloric acid it should be given in dram doses to be sipped in water or sweetened orange juice during meals. Doses of less than a dram do not appear to be helpful. Recently Minot and Patek¹⁴ have obtained a satisfactory response from feeding concentrated bile pigment of low iron content. It is their belief that the deficient ma-

terial may be supplied by bile pigment as well as by iron.

To illustrate what has been said about idiopathic hypochromic anemia, I wish now to present two case records.

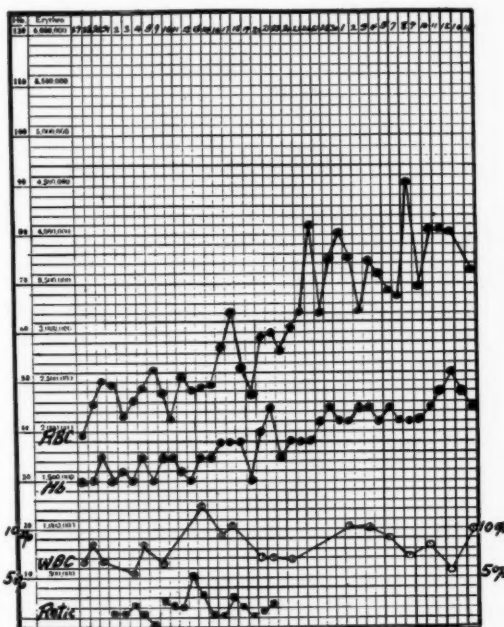


Fig. 1. Chart indicating rise of red blood cells, hemoglobin and the reticulocyte response.

The first patient was a white female sixty years of age whose chief complaint was weakness. She dated the onset of her symptoms to 1930, at which time she noted pallor, dyspnea and a sore tongue. She later noted early satiety, constipation, tachycardia, edema and nocturia. The past medical history was important because it revealed that a gastroenterostomy had been performed for a gastric ulcer in 1918. Since the onset of her illness she had received liver both orally and parenterally.

Physical examination revealed a well developed, well nourished white female who appeared tired. The skin was pale. There was puffiness about the eyes, the tongue was bald, the heart was slightly enlarged, there was a systolic murmur at the apex and at the base. There was moderate peripheral sclerosis. The pulse rate was 88, regular and of good volume. The blood pressure was 130/75. The liver edge was just palpable.

The urine was normal. The red blood count was 1,940,000, the hemoglobin 30 per cent and the color and volume indices both 0.8. The icteric index was 4, 4 and 6 upon three occasions. The stool was negative for ova and parasites and upon one occasion was posi-

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tive for blood by the guaiac test and also for urobilinogen. Gastric analysis showed a total acidity of 18 degrees and an achlorhydria. A gastro-intestinal x-ray showed a well functioning gastro-enterostomy with a narrow antrum.

Our impression at the conclusion of our studies was idiopathic hypochromic anemia. The patient was placed upon saccharated ferrous carbonate twenty grains four times a day and dilute HCl, one dram t.i.d. Because of the excessively low red count she was also given 3 c.c. of Lilly's liver extract 343 intramuscularly every five days for five doses. Despite this intensive therapy she did not experience a reticulocyte response until the thirteenth day, whereas commonly the response occurs between the fifth and ninth. Because of the history of gastric ulcer, malignancy was suspected, but a repeated negative x-ray study, together with the lack of other symptoms and finally the response, satisfied us that malignancy was not present. Upon discharge two months after admission her red count was 4,050,000 and her hemoglobin 48 per cent. Figure 1 demonstrates the response graphically.

This case is of particular interest because of the history of gastric ulcer and subsequent gastro-enterostomy. We have already learned that such surgery may precede the development of anemia. The possibility of malignancy in these cases must always be considered and every effort directed to ruling it out. Paradoxically to what has been said, liver was administered to this patient. When a count is as low as that noted every effort must be given to boosting that count. Theoretically liver does no good, but occasionally a mixture of the two types of anemia is encountered and mixed therapy may help. It is a moot question in my mind whether liver therapy was of benefit here. I wish to call your attention to the fact that this case was first diagnosed as pernicious anemia but that that diagnosis had to be revised when the laboratory work was completed. This is an oft repeated mistake made in the absence of careful study of the blood, hence an unnecessary one.

Our second case is that of a white female forty-eight years of age whose chief complaint was weakness. History of the illness revealed that she dated the onset, which had been very insidious, to about five years before and the exact symptoms could not be recalled. However, a year later, she became so edematous and weak during a pregnancy that it was necessary to terminate the pregnancy. Sterilization was performed at the same time. Following this she irregularly took medicine for anemia. She gained some weight. In January, 1933, she again became weak and was given a blood transfusion. During the winter of 1933-1934 weakness returned and persisted until the

time I saw her. Other symptoms included vertigo, occasional tinnitus, a frequently sore tongue, dyspnea, palpitation and arrhythmia upon exertion. There had been edema of the legs at night, jaundice of several years' duration, diarrhea, difficulty in swallowing solid foods, a dietary which excluded proteins and tended

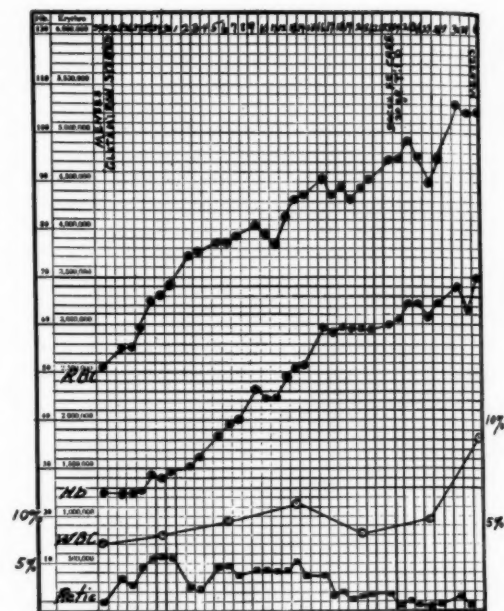


Fig. 2. Chart indicating response of red cells, hemoglobin and reticulocytes to iron therapy.

to a high carbohydrate type. Past medical and social history were irrelevant. Family history indicated that her mother had died of anemia.

Physical examination revealed a small, well developed but well nourished white female about forty-eight years of age. The skin at first gave the impression of jaundice, but on closer inspection no true icterus was evident, but rather a sallow appearance. There was generalized pallor of the skin and mucous membrane, some pitting edema of the legs, the tongue was atrophic in type, thyroid was palpable, the lungs were normal with the exception of a few râles at the bases posteriorly, the heart was not enlarged, there was a systolic murmur at the apex widely transmitted. The pulse rate was 90 and regular, the blood pressure was 110/64. The liver edge was palpable and the spleen was palpable five centimeters below the costal margin. The nails were thin, friable and spoon shaped.

Laboratory examinations included urinalysis, which was negative. The red blood cell count was 2,500,000, hemoglobin 25 per cent and the color index 0.5. The white blood count was 3,500 with 62 per cent neutrophils and 38 per cent lymphocytes. There were no reticulocytes. Gastric analysis revealed a total acidity of 14 degrees and no free acid. The icteric index was

four. Negative stools. In the pernicious A su sick fo acerbati during and fa fresh brought icterus. ma an oratory pathic of red red ce and a glutam ure 2 increas globin In to the nicious mia. exam chron sentia there the in with ure o pathic tric d unab in tu and v and may anem conta hypo inorg In more

four. X-ray studies of the gastrointestinal tract were negative; parasites and blood were absent from the stools.

In this case again the differential diagnosis included pernicious anemia and idiopathic hypochromic anemia. A survey of the history shows that the patient was sick for five years with periods of remissions and exacerbations, during which time she was extremely ill during a pregnancy. There was a history of a dislike and failure to eat such foods as green vegetables, fresh fruits and meats. The physical examination brought out the important points of pallor, without icterus, bald tongue, spoon nails, palpable spleen, edema and cardiac murmurs due to the anemia. The laboratory examination clinched the diagnosis of idiopathic hypochromic anemia by revealing the presence of reduction of hemoglobin out of proportion to the red cell reduction, achlorhydria, an icteric index of 4 and a color index of .5. The patient was placed upon glutamiron and rapidly responded to this therapy. Figure 2 indicates the beauty of the response with a total increase of red blood cells to 4,800,000 and a hemoglobin of 65 per cent in a little over a month's time.

In closing I wish to call your attention again to the importance of differentiating between pernicious anemia and idiopathic hypochromic anemia. The important points in history, physical examination and laboratory findings in hypochromic anemia have been noted above. It is essential to remember that in pernicious anemia there is missing an element which we know as the intrinsic factor, failure of which to interact with the so-called extrinsic factor leads to failure of maturation of the megakaryoblast. In idiopathic hypochromic anemia there is also a gastric dysfunction whereby the human organism is unable to utilize organic iron in the diet, which in turn interferes with erythroblastic maturation and we have a failure of hemoglobin production and deficient red cell manufacture. Both, then, may be termed deficiency anemias. Pernicious anemia responds to liver and other substances containing the intrinsic factor while idiopathic hypochromic anemia responds to large doses of inorganic iron.

In the future we shall probably see many more cases of idiopathic hypochromic anemia be-

cause we are better able to differentiate this condition from pernicious anemia and also because we will not ascribe what is apparently a secondary anemia to bleeding hemorrhoids, abnormal menstruation and similar conditions.

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ASCITES OF INDETERMINATE ORIGIN*

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WHEN we consider that ascites is a result of disease and not a disease in itself, and that definite abnormal physiologic processes have taken place to produce this condition, we are urged to ascertain by clinical and laboratory methods the underlying cause in order that our treatment shall be rational and our results satisfactory.

The commoner causes of ascites are myocardial failure, cirrhosis of the liver, tuberculosis of the peritoneum, malignant disease within the abdomen, nephritis, and polyserositis. However, we have had under observation eight patients with ascites, whose condition does not fit in with any of these just named, if we accept the generally recognized criteria for diagnosis (Table I). Five of these patients are males and three females. Their ages ranged from seventeen to sixty-nine years, and six of them were between the ages of thirty-eight and fifty-five years. The onset of ascites varied from two to nine months before registration, and on examination there was associated edema of the lower extremities, graded 1 to 3. None of the patients had hypertension, nor did any give evidence of gross arteriosclerosis. Examination of the fundus was carried out in six cases, and nothing essentially abnormal was noted. There was neither subjective nor objective evidence of myocardial disease. The liver was not strikingly enlarged or abnormally hard, although it was palpable in three cases. In none of the cases was there the visible collateral abdominal venous circulation so frequently seen in patients who have cirrhosis of the liver. There was no history of hematemesis, or other evidence of esophageal varices. All of the patients gave evidence of having some tendency to anemia, but in only one case was anemia marked. Jaundice was absent. The concentration of serum bilirubin was normal. Tests of hepatic function were made in seven cases; they revealed no retention of dye in five cases, and retention of dye graded 1 in two cases. With such findings, evidence was

lacking to sustain a diagnosis of hepatic cirrhosis.

The possibility of tuberculous peritonitis was considered in all of the cases. In five cases laparotomy was done and later, in two of these, necropsy was performed; evidence of tuberculosis was not found. In the other cases, the course, history and findings could not justify a diagnosis of tuberculosis. That we might be dealing with cases of intra-abdominal malignancy was considered. In five cases this condition was excluded by abdominal exploration, necropsy, or continued good health for six to eight years. In Case 5, discrete, enlarged mesenteric lymph nodes were found, but a positive diagnosis of intra-abdominal malignancy was not made. In Case 6 a tumor of the stomach was suspected after roentgenologic diagnosis, but a positive diagnosis was not made. The patient's condition did not permit of exploratory operation. Malignant disease probably was present in this case (Tables I, II and III). Chronic glomerulonephritis or lipoid nephrosis was considered, but the negative urinary findings ruled out such a diagnosis in seven cases. In a single, Case 1, the value for blood urea rose to 149 mg. per 100 c.c. following twelve intravenous injections of salyrgan (12.5 c.c.), 74 gm. of ammonium nitrate, and 6.0 gm. of euphyllin (Tables II, IV and V). Later, however, the value for urea dropped to normal; urinalysis gave negative results, and has continued to do so since. This patient, nine years previously (1918) had undergone left nephrectomy for left nephrolithiasis with functionless left kidney, and at that time a diagnosis of right pyelonephritis had been made. This patient, eight years after the occurrence of ascites, is alive, well, and working. It is possible, but not likely, that renal insufficiency produced the ascites. That these patients did not have polyserositis would seem to be apparent by the absence of fluid or other inflammatory changes in the pericardial and pleural cavities.

The ascites in all of these cases was the dominant feature. Some edema also was present, but was confined to the lower extremities and prob-

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TABLE I. INDETERMINATE ASCITES: GENERAL DIAGNOSTIC FEATURES

Case	Date	Age, years and sex	Duration since onset, months	Liver edge palpable cm. below the costal margin	Edema, grade	Basal metabolic rate	Liver function dye retention, grade	Comment
1	3-7-27	47M	9	2	1		0	Right pyelonephritis
2	4-27-28	39F	5	0	3		0	
3	11-4-27	55F	4	0	1		0	
4	12-11-29	49F	7	0	3		0	
	10-24-31	51	29	0	0		0	
5	2-16-29	47M	2	0	2		0	
6	9-26-25	69M	6	0	2	-16	1	Tumor at angle of stomach (?) Acromegaly (?)
7	2-26-30	17M	6	6	3	-22 -18 -7		
	8-28-30		12	2	0	-7	4	Intermittent fever
8	9-14-26	38M	9	9	1		1	Intermittent fever

In all cases the blood pressure was within normal limits. Ascites present and no demonstrable abdominal collateral circulation, no jaundice. Serum bilirubin normal.

TABLE II. INDETERMINATE ASCITES: RESULTS OF TREATMENT

Case	Days in hospital	Maximal diuresis	Weight loss, pounds	Ascites after treatment	Toxic reactions	Immediate results	Living and well after six years	Dead	Duration of life from onset, months
1	28	2400	28.0	0	Blood urea, 149 mg. per cent	Good	+		
2	43	2700	28.0	0	0	Good	+		
3	23	1700	47.0	0	0	Good	+		
4	10	3600	?	0	Mercury dermatitis (?)	Good			
	8	1600	20.0	0	0	Poor		+	29
5	22	3050	27.5	+		Poor		+	8
6	59	4800	41.0	+	0	Good		+	10
7	11	1700	20.0	0	0	Good			
	17	1000	8.0	0	0	Good		+	18
8	32	10000	8.0	0	0	Poor		+	10

ably was secondary to the intra-abdominal condition. Estimation of certain constituents in the blood gave practically normal values in all cases. The exceptions were in Cases 1 and 7 (Table IV). In the former, the value for urea was normal before treatment, but, as previously has been noted, rose to 149 mg. per 100 c.c. following the use of diuretics. In Case 7 the value for serum protein was definitely reduced to 4.6 gm. per 100 c.c. Later severe hepatic insufficiency developed in this case, as is indicated by retention of dye grade 4 (Tables I, II and IV). Salvesen, and Bennett and associates have reported a decreased concentration of serum protein in hepatic disease.

Operative and Pathologic Findings

In the five cases in which exploration was made, very enlightening data were obtained, both of negative and of positive value (Table V). In Case 2 the peritoneum was normal and glistening in appearance. A large amount of ascitic fluid was present. The right oviduct and ovary had been removed at a former operation. There was evidence of a previous pelvic inflammatory condition, and the stump of the left oviduct, and the left ovary, formed a necrotic mass of tissue. Inoculations of guinea pigs, and direct examination of the fluid were negative for bacilli of tuberculosis. Following this operation, ascitic fluid re-accumulated, necessitating several aspira-

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TABLE III. INDETERMINATE ASCITES: CAUSE OF DEATH

4	Thrombosis of portal vein with atrophy of liver. Acute infarct of jejunum with hemorrhage
5	Unknown; possible intra-abdominal malignancy
6	Unknown
7	No necropsy. Meningitis (?), secondary to sinus infection
8	Abscess of liver

tions. Treatment with diuretics was subsequently successful.

The findings in Case 3 were interesting. The liver was normal, with no evidence of cirrhosis. The peritoneum was of normal appearance. A cystic tumor of the right ovary, measuring 12 by 15 cm., and weighing 45 gm., was composed of a teratoma, a fibroma, and a mass of tissue which grossly and microscopically resembled adult and fetal thyroid substance with some portions of undifferentiated, fetal thyroid tissue. Also, some portions resembled exophthalmic goiter. However, clinically there was no evidence of hyperthyroidism. There was considerable inflammatory reaction where the tumor was attached in the culdesac, and it was thought possible that this could have been the irritant that produced the ascitic fluid. There was no histologic evidence of malignancy.

On exploration in Case 4, a large amount of milky fluid was drained out, and a tumor was removed which proved to be a left, multilocular ovarian cyst, measuring 14 to 8 by 7 cm. and weighing 210 gm. It contained colloid and fetal thyroid adenomas. With these findings it is interesting that the patient gave no clinical evidence of having hyperthyroidism. Malignant cells were not found. Following the operation, the ascites recurred, necessitating abdominal paracentesis every ten to fourteen days. At these aspirations, from 9,500 to 17,400 c.c. of clear, straw colored fluid were obtained. Eleven months later a second exploratory operation was done, but nothing abnormal was found. Three weeks later severe abdominal pain developed, and this was followed by profound shock, from which the patient did not recover; death ensued fifteen hours later. Necropsy revealed thrombosis of the portal vein, with atrophy of the liver, acute infarction of the jejunum, and hemorrhage (Table

III). The liver weighed 1,560 gm.; the spleen was atrophic, weighing only 35 gm.; the kidneys weighed 305 gm. The histologic findings in the liver and kidneys were described by Dr. D. C. Beaver of the section on pathologic anatomy: The liver was almost normal in appearance; there was mild congestion of the sinusoids, and fatty infiltration. No real cirrhosis was present, but in an occasional interlobular zone there was slight increase of connective tissue elements, and in some parts of the liver the interlobular spaces were somewhat increased, and the capsule was of increased thickness. All of the connective tissue changes were the result of focal atrophy of hepatic parenchyma. In the kidneys were local regions of parenchymal atrophy within the cortex, especially in the subcapsular portion, with replacement of connective tissue; otherwise the kidneys were essentially normal. This cortical change may have been provoked by pyelonephritis in the past, which later had become entirely healed. It did not appear to be the result of vascular disease.

On abdominal exploration in Case 5, about 700 c.c. of chylous fluid was removed. Palpation in the region of the liver revealed a thickened gallbladder, and a discrete nodule about 1.5 cm. in diameter. There were several small, indurated lymph nodes along the common bile duct, which varied in size from 1 to 1.2 cm. in diameter. The right kidney was enlarged to about three or four times normal size, and felt as if it were hydro-nephrotic. In the mesentery of the intestine could be felt numerous discrete lymph nodes, approximately 1 to 1.5 cm. in diameter. No single tumor blocked the flow of chyle. Tissue for biopsy was not obtained, and it was questionable whether the lymph nodes had undergone inflammatory or malignant change.

In Case 8 the gallbladder, which contained stones, had been removed twelve months previously, at which time subacute hepatitis, grade 4, had been observed. At the time of the exploration to determine the cause of the ascites, there was about 1 liter of straw colored fluid in the abdominal cavity. The liver and spleen were very large, the liver extending 4 inches (10.0 cm.) below the costal margin, and the spleen was about three times normal size. Tissue from the liver, on microscopic examination, was reported to give evidence of hepatitis, grade 2, and of fatty degeneration, grade 2. The pa-

ASCITES—BINGER AND KEITH

TABLE IV. INDETERMINATE ASCITES: LABORATORY DATA

Case	Blood							Phenolsulphophthal- ein, per cent
	Hemo- globin, per cent, Dare	Erythrocytes, millions	Urea, mg. per cent	Plasma		Serum		
				Chlorides, mg. per cent	Carbon diox- ide combining power, vol- umes, per cent	Protein, gm. per cent	Albumin- globulin ratio	
1	60	3.34	22	590	46	5.9		45
2	72	4.20	12	636	68	5.6	1:0.8	50
3	68	4.76	32	645				55
4	80	4.92	38					80
	73		24	594		6.2	1:1.3	40
5	80	4.19	20		65			70
6	67	3.09	40	600	54			40
7	74	3.87	22	639		4.6	1:1.0	80
	72	4.49	18					
8	34	1.92	19	580	50			
	47	3.04						

Routine urinalysis essentially negative in all cases.

TABLE V. INDETERMINATE ASCITES: TREATMENT

Diuretic and surgical

Case	Ammonium nitrate, gm.	Ammonium chloride, gm.	Organic mercury, c.c.	Fluid removed by abdominal paracentesis, c.c.	Surgery	Operative findings
1	74		12.5			
2	195		10.5	Large amount	Laparotomy	Pelvis inflammatory, not tuberculous
3	90		2.5		Right oophorectomy	Cyst contained fetal and adult thyroid and exophthalmic goiter tissue
4	28		5.0	11,700	Laparotomy; Left oophorectomy	Multilocular cyst of left ovary contain- ing adenomatous thyroid tissue
	26			9,500 11,000 11,700 11,000 17,400	Laparotomy	Negative abdominal exploration
5	112		3.5	700	Laparotomy	Abdominal exploration, chylous as- cites, numerous discrete nodes in mesentery; no blocking of chyle
6		264	6.5			
7	86		1.5			
	66		0.5			
8		58	1.5	1,000	Laparotomy	Liver and spleen enlarged; subacute hepatitis

tient died three days later and a large pyogenic abscess of the liver was found, containing 1,000 c.c. of greenish-yellow pus. It was not an amebic abscess or an echinococcus cyst (Table III). The weight of the liver was 4,250 gm., of the spleen, 1,125 gm., and of the kidneys 600 gm. Microscopic examination of the liver disclosed a moderate degree of passive congestion and

fatty degeneration. Regions of acute infarction were present. The abscess presented the usual picture of necrosis resulting in atrophy and disorganization of parenchyma, with increase of connective tissue but no cirrhosis. The renal glomeruli were extremely large, and their large, patulous capillary loops were engorged with blood. The epithelium of the cortical tubules

TABLE VI. INDETERMINATE ASCITES: TREATMENT
Diet
Diet and fluid intake

Case	Sodium chloride content	Protein, gm.	Fluid in food, c.c.	Extra fluid intake, c.c.	Total fluid intake, c.c.
1	Weighed ionic *	40	800	800	1600
	Salt free †		1200	1200	2400
2	Weighed ionic	50	800	600	1400
	Low salt ‡		1200	600	1800
3	Weighed ionic	40	800	800	1600
	Salt free	60	1200	800	2000
4	Low salt	50	1200	1200	2400
	Salt free	50	1200	800	2000
5	Weighed ionic	50	800	1000	1800
	Salt free		1200	1000	2200
6	Low salt	50	1200	1200	2400
	Salt free	50	1200	800	2000
7	Low salt	50	1200	600	1800
	Salt free		1200	600	1800
8	Low salt	60	1200	2500	3700

*Sodium chloride content approximately 1.0 to 1.5 gm.

†Sodium chloride content approximately 2.0 to 3.0 gm.

‡Sodium chloride content approximately 4.0 to 5.0 gm.

was swollen, and sometimes vacuolization and granular degeneration of the cytoplasm of cells were seen. The findings were those of hypertrophy of the glomeruli and mild tubular degeneration.

Treatment

All patients were observed in the hospital. Diets were controlled. They were low in content of salt or were salt-free, and contained protein in the amount of from 40 to 60 gm. daily. The intake of extra fluid was controlled, and varied from 600 to 2,500 c.c. per day, totalling, with the fluid of the food taken, to from 1,400 to 3,700 c.c. daily (Table VI).

Diuretics used consisted of ammonium nitrate or ammonium chloride, 8 to 12 gm. per day, together with organic compounds of mercury given intravenously in doses of from 0.5 to 2.5 c.c., at intervals of several days. Derivatives of theobromin were not used extensively in this group of cases, for there seemed to be no contra-indication to the use of the more powerful diuretics (Table V).

Abdominal paracentesis was done in four cases, and in one case (Case 4) this was per-

formed six times. Some of the fluids obtained were clear and amber colored; some were chylous. The amount of fluid varied from 700 to 17,400 c.c. Abdominal exploration was carried out in five cases, as previously has been mentioned (Table V).

Results of Treatment

The immediate result of treatment was considered good in five cases and poor in three cases (Table II). In one of the latter three cases, the response was good on the patient's first visit, but subsequently she reacted poorly. In two of the latter three cases the patients died while in the hospital. However, in only two cases was there any demonstrable ascites at the time of dismissal. Loss of weight ranged from 8 to 47 pounds (3.6 to 21.3 kg.), a mean of 27½ pounds (12.4 kg.). The maximal diuresis following the administration of diuretics ranged from 1,000 to 10,000 c.c. in twenty-four hours, and in only three cases was it below 2,000 c.c.

Three patients are living and well after six years. The five who died lived from eight to twenty-nine months after the onset of symptoms, and of three of these the cause of death is unknown.

Comment

It would appear from these studies that ascites can be produced by factors other than those that can be determined by available physical or laboratory diagnostic methods. Often, abdominal exploration will assist in solving the problem, and usually it is not attended with serious undue risk to the patient.

Cases of ascites in which ovarian tumors are present occasionally have been reported. In Case 3 the ascites did not recur after removal of the teratoma of the right ovary. There was considerable inflammatory reaction around the site of the tumor and this may have been the cause of the ascites. In Case 4, however, the ascitic fluid re-accumulated after removal of a multilocular cyst of the left ovary, and on subsequent abdominal exploration, cause for the ascites could not be found. Later, at necropsy, portal thrombosis was found, as has been mentioned.

The actual pathologic physiology which produces the ascites in these cases still is not clear. It is striking that there was no good evidence

of hepatic cirrhosis in any of these cases, and that this condition was definitely excluded by surgical exploration in five, and by histologic studies in two, of these cases. It is possible that congestion of the liver secondary to circulatory disturbances or toxic agents was important in some of these cases. Weir and Beaver have reported the presence of ascites in a series of cases in which, at necropsy, chronic portal thrombosis was found.

The ascites often can be successfully treated by careful dietary control, low intake of fluid, and the use of diuretics (Tables V and VI). We at present, prefer the use of potassium nitrate to ammonium nitrate or ammonium chloride, for it is less likely to produce toxic reactions, such as renal insufficiency, acidosis, or methemoglobinemia.² It can be given in doses of 8 to 12 gm. per day, in enteric coated pills, or it may be given in capsules or in 25 per cent solution. Organic compounds of mercury, such as salyrgan, are usually successful. An initial dose of 0.5 c.c. is given intravenously, and if no untoward reaction results, 2 c.c. may be given every three or four days. However, it should not be employed in the presence of distinct renal insufficiency or when gross hematuria is present. If the ascites cannot be controlled by

such measures, abdominal paracentesis may be repeated when necessary.

Summary

Cases of ascites of indeterminate etiology do occur. Diagnosis is often difficult. Thorough clinical examination, including routine and special laboratory studies, is important. Paracentesis, and even abdominal exploration, may be necessary in order to establish a diagnosis. Treatment includes the use of suitable diets, diuretics, and surgical procedures. Recovery took place in a third of the patients of this series of cases.

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AMEBIASIS: DIAGNOSIS, PREVENTION AND TREATMENT*

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IN SPITE of the fact that the pathogenic ameba of man that Loesch first described was obtained from the stool of a patient in St. Petersburg, Russia, many physicians in temperate zones always have thought of amebiasis as a tropical disease. It is true that prior to 1911, when Sistrunk published his paper, no one had seriously considered the disease as being present in temperate zones. Since that time, many investigations have clearly demonstrated the rather widespread prevalence of amebiasis throughout the entire temperate zone. The exact incidence

of the disease is, unfortunately, unknown, but judging from numerous special surveys made by different observers in the United States and abroad, it is more than likely that Craig's conclusion that amebiasis is prevalent in from 5 to 10 per cent of the population is amply justified. This, of course, does not necessarily mean that the level at which symptoms are present has been reached by anywhere near that percentage of persons, but, if stools are thoroughly examined, one might expect to find the average incidence of *Endamoeba histolytica* in the neighborhood of at least 6 per cent of persons taken at random.

*From the Division of Medicine and the Division of Clinical Pathology, Section on Parasitology. Read before the Minnesota State Medical Association. Duluth, Minnesota, July 16, 1934.

Diagnosis

It is patent that the absolute diagnosis of amebiasis is accomplished only when *Endamoeba histolytica* has been identified in the stools, tissues, or bodily discharges. It must at once be recognized that because of the possible presence of at least four other amebas, and several other protozoa, identification of *Endamoeba histolytica* must be made by those especially qualified to recognize the species. Unfortunately, medical schools do not teach students to identify these species with any high degree of accuracy and, to become qualified, one must spend a considerable period of time in training and study under someone who is expert in the identification of these species. Further, one must have access to a large amount of material in order to become experienced enough to be accurate.

Five major methods of diagnosis are available.

1. Direct examination of stools or bodily discharges may be made. As a general rule, cysts will be found in formed stools while in loose stools one may expect to find trophozoites. Fresh material containing cysts may be stained with Lugol's solution in order to study the number and structure of the nuclei.

2. Study may be made of stained specimens. This requires a considerable amount of training and experience in the preparation of proper slides and thorough knowledge of staining with iron hematoxylin.

3. Cultural methods may be used. In recent years, a large number of modifications of the original Boeck and Drbohlav medium, as well as other mediums, have been devised. In the hands of many, cultural methods have proved highly successful. However, one should have clearly in mind the fact that amebas growing in cultures present some very real difficulties in identification and that there has yet to be published a detailed description of amebas growing in cultures, correlated with experimental studies to prove their pathogenicity. Until this is done, the cultural method will have a serious drawback, and should be used only by those thoroughly familiar with all phases of the study.

4. Complement fixation may be employed. This method depends on the identification of antibodies in serum by means of an antigen made of an alcoholic extract of amebas obtained from cultures. The test is entirely too complicated, and the antigen too difficult to make, to advocate

its use as a routine. However, if improvements and simplifications can be made, it promises to be an extremely useful test.

5. *Endamoeba histolytica* may be identified in tissues. This requires that the tissue shall be preserved in a suitable preserving medium, preferably Schaudinn's fluid, and at least some sections stained with iron hematoxylin. The lesions of amebiasis are not characteristic enough to be identified unless the organisms themselves are clearly seen. The criteria on which *Endamoeba histolytica* itself is identified have been thoroughly discussed in many standard textbooks, and will not require further elucidation here.

It is important, however, to call attention to the fact that in examining loose or liquid stools, it is imperative that the material be examined very fresh and that the stool be kept at body temperature from the time it is passed until the examination is made. In examining formed stools, these precautions are not necessary, but the stools should be as fresh as possible. It will require, according to Svenssen and Linders, at least ten negative, formed stools from a patient before protozoal infestation can be ruled out. Our experience has shown that in examination of a group of patients a single specimen from each, following administration of magnesium sulphate, will reveal about 80 per cent of infestations, that two stools from each patient will yield more than 95 per cent of infestations, and that three stools will yield approximately all infestations.

Transmission of Disease

The recent outbreak of amebiasis in Chicago strikingly called attention to the fact that only a few of the fundamental phases of the transmission of *Endamoeba histolytica* from one patient to another are known. Evidence supports the conclusion that normally the trophozoites multiply by division only in the body of the host, and that both encystation and excystation take place there also. It is further evident that the cyst is the stage in which the parasite is transmitted from host to host, and that development of the membrane of the cyst is a protective feature for the parasite. Experiments have demonstrated that if the cysts are washed free of fecal material, or are suspended in a great deal of water, they will survive in water for many weeks, and they may survive short periods of

exposure to reasonably cold temperatures. It has also been demonstrated that they will withstand high concentrations of chlorine, and that the ordinary method of chlorinating water for domestic purposes in no way affects the viability of the cysts. In suitable experimental mediums, the entire life cycle of the parasite may be carried out, but there is no evidence that this takes place in nature outside the body of the host. All of the evidence points to the fact that the trophozoites cannot be transmitted from host to host except by injecting them into the rectum. Those that might be swallowed are evidently destroyed in the upper part of the intestinal tract, the cyst alone being able to pass through the stomach and intestines unharmed. It is evident, therefore, that as long as the patient is having acute symptoms, or is passing loose stools, the organisms present, which are usually trophozoites, are in no way dangerous to other individuals. It is only when the amebas are passed as cysts that the fecal discharges become a menace.

When excystation takes place, the four-daughter cell mass of protoplasm escapes through the ruptured cyst wall and immediately begins to feed. Division of the nuclei takes place, and an eight-daughter cell metacyst forms. Each nucleus, with an accompanying bit of protoplasm, is eventually broken off and the eight new trophozoites settle down in a suitable region of stasis, or in a small crypt, or in a surface depression in the bowel, and begin their surface attack on the mucosa from which eventually develops the more or less typical amebic ulcer.

It is by no means clear exactly how viable cysts find their way into a new host. In the past, several methods have been considered important. It has been known for a long time that the cysts of *Endamoeba histolytica* not only can be transmitted on the feet of flies to food but may even be transmitted in the droppings of flies after the cysts have passed through the alimentary tract of the insect. In 1916, an outbreak in El Paso, which involved 118 cases was reported by Craig. The epidemic was traced to transmission by flies, which were numerous in the camps at the time. No epidemic occurred in the civilian population of El Paso although the water supply was identical with that of the troops.

The transmission of amebiasis by carriers who might be handling food, or who in other ways

contaminate the food or water ingested by others, has been considered of great importance. Recently, however, the experiments of Kaplan and the experience in the Chicago outbreak have caused considerable doubt to be placed on this means of transmission as a common method. Kaplan showed by a series of experiments that when fecal material contaminated with cysts of *Endamoeba histolytica* is placed on the fingers, all cysts die within five minutes and that practically all are dead within ten minutes. These experiments bring out very forcibly the fact that the cyst of *Endamoeba histolytica* is very quickly killed when it becomes dry, and that unless the food handler transmits cysts from his contaminated fingers to moist food within a very brief period of time, there is no chance of spreading the disease by that method.

The possibility of raw food, such as vegetables, transmitting viable cysts is also relatively remote, even though the vegetables are raised where excreta of man is used for fertilizer or where irrigation is by contaminated water. Unless these foods are kept moist, and are consumed fairly soon after gathering, the effect of drying and aging of the cysts will destroy them; thus protecting the person who ingests the food. If certain foods are grossly contaminated, it is possible that the disease might be transmitted by such means.

It is further evident, from the experiments of Walker and Sellard, and from those of numerous experimenters who used kittens as test animals, that a large number of cysts is required to produce infestation, and that transmission of a large number of viable cysts by contaminated hands is well nigh impossible. It must be, therefore, as McCoy has recently concluded, that carriers among food-handlers do not appear to be so much of a menace as they were once thought to be. This, furthermore, calls attention to the fact that no particular attention need be paid to contacts of either patients or carriers.

In the light of present knowledge, it would appear that the most probable common mode of transmission of the disease is through contaminated water. It is in this medium that cysts may live for a long time, and because of the large volumes of potable water consumed by individuals, it seems most likely that this is the major means of transmission of the disease.

It should be evident that the water supplies

of many cities and towns, although rendered satisfactory by chlorination so far as bacterial contamination is concerned, are likely to contain viable cysts of *Endamoeba histolytica*. This is because sewerage is emptied into the same body of water from which the drinking water is derived. This applies to most communities of which the water supplies are lakes and streams; there are many such communities in the United States.

In the Philippine Insurrection, clear-cut evidence was obtained that contaminated water was responsible for the explosive and severe amebic dysentery which was encountered. Again, with the expeditionary forces in Egypt, the same observation was made. The evidence from the Chicago outbreak again intensifies the importance of the transmission of amebiasis by water for it was clearly shown that contaminated water within two hotels was responsible for the outbreak. This brings up once more the importance of sanitary engineering, not only in relation to amebiasis, but also in relation to other diseases.

Through the efforts of Mr. H. A. Whittaker of the Sanitary Division, and of Dr. A. J. Chesley, Executive Secretary of the State Board of Health, the State of Minnesota obtained some of the earliest laws governing cross connections of water supplies, and similar regulations have been passed by many other states and by the United States Department of Public Health. Nevertheless, cross connections between unsafe and safe water supplies, and between sewage systems and safe water supplies, are altogether too frequent. It is safe to say that there are but few large public buildings in this state in which at least one questionable water connection could not be found. It is not generally realized that failure of water pressure and flooding of sewer systems frequently cause water supplies to become contaminated and that the numerous plumbing fixtures in hotels, public buildings, and hospitals, as well as in private homes, often lead to serious cross connections.

Just how such cross connections might operate can be clearly understood from such observations as those of Morris, in Pasadena. He reported that in the residence of a physician an offensive condition of the water was noted on occasions. Investigation showed that the small sized piping and limited water pressure caused the content of the second floor siphon-jet toilet,

with flush valve, to siphon into the water system whenever a toilet was flushed on the first floor. He also recorded an instance in which water was drawn, by back siphonage, from a toilet on a higher floor, into the kitchen sink. Finally, he described an occasion in which a plumber was called to a residence to open up an overflowing toilet on the second floor. The man closed a valve at the curb and opened a valve downstairs to drain the system. Much to his consternation, the highly offensive content of the toilet bowl was drained out through the flush valve into the rest of the system.

In further testing of valves of the sort mentioned it was shown that it made little difference whether the water entered the bowl at the top or at the side, or whether the valve was placed at a distance from the bowl or not. Bowls with siphon-jets could be back siphoned into the general water supply in thirty to forty seconds, at a high vacuum, and in less than five minutes when the suction was only $2\frac{1}{2}$ inches. In the wash-down type bowls, without the siphon-jet, any contamination adjoining the under-rim water outlets is sucked back into the water supply by a siphon, even though the bowl is not stopped up.

Contamination of the sanitary water from this type of toilet may result even though the sewer line in the building is not plugged. Sometimes the sanitary sewers in the city streets become clogged and the sewerage backs up and overflows toilets, especially those situated in the basement. In some towns, the sanitary and storm sewers are connected, and during severe storms the sewers are so overtaxed that sewerage backs up. If draw-downs of water are made at these times, or if the pressure on the water supply line fails, the content of the sewer will be drawn into the sanitary water system.

Even under normal conditions, vacuums may be formed on the water lines of tall buildings and many times throughout the day momentary vacuums form even though the pressures on the top floors are as great as 10 to 15 pounds. This condition is caused by greater use of water on the lower floors or by a general drop in pressure on a portion of the distributing system. Any plumbing fixture which has an under-rim, or low bell type of feed, is potentially a source of contamination of water and should under no circumstances be permitted to remain in use.

It is possible that none of our modern meth-

ods of taking care of potable waters which involve sedimentation and filtration will completely remove amebic cysts, and chlorination will not kill them. At the present time, we are left with one preventive measure, that of protecting the drinking water supply from every possible source of contamination with sewage, as the only definite and practical means of preventing amebiasis.

Public fear of amebiasis has resulted in the request of a school board that a teacher resign; or the question being raised whether it was safe to permit a patient to continue working in a store or office, and so on. As has been pointed out, amebiasis is probably spread chiefly by infected water, so that any patient or carrier is a potential source of trouble if his feces find their way into drinking water. For all practical purposes, if sewage disposal facilities preclude the possibility of waste matter getting into the water supply, if a patient is cleanly in his personal habits, and if the sewage system in homes or buildings conforms to the law, there is little or no danger from any patient. In our experience, we do not recall any instance in which, in a family of which one member had amebiasis, another became infested unless both members were originally exposed at the same time. Many individuals who have returned from trips have been found to be infested with *Endamoeba histolytica*, but others in the family, who remained at home, have not contracted the disease. An unfortunate phase of the publicity concerning the Chicago outbreak led many people to consider a patient with amebiasis much more of a menace to society than was the leper in Biblical times. McCoy now reports no satellite epidemics resulting from cases of amebiasis contracted in Chicago.

Treatment

Two outstanding problems confront the physician in the treatment of amebiasis: 1. Many people, both physicians and patients, have feared that the disease is incurable. 2. The dangers of treatment by emetine and arsenic have been overemphasized to the point that often doses are too small and courses too short to give a possible chance of a cure.

Curability.—Clinicians of great experience, such as Rogers, Craig and James, who have seen the severe manifestations of amebiasis in

the tropics, have taught that in these cases it is doubtful if the word "cure" ever should be used. Their constant and unremitting search for effective amebicides has directly and indirectly served to provide the newer and more effective remedies. Although there is no question that *Endamoeba histolytica* is the same parasite in Saskatchewan as it is in Madras, yet it is reasonable to speculate that the general resistance and health of the white man when he is in the North is probably higher than when he invades the tropics. This may explain why infection may be most serious, yet the incidence of rapidly fatal infections is less in the North than in the tropics. Even in outbreaks of overwhelming infection, one of which was seen a year ago, very few deaths have been reported in cases in which operation was not performed. Certainly experience at The Mayo Clinic has shown an encouragingly higher percentage of apparent cures, as our regimen of treatment has improved. In many of the cases in which the infestation was contracted in Chicago, and in which we have prescribed treatment, public interest had so stimulated the patients that follow-up examinations were not only readily obtained but were requested by the patients. We hesitate to be definite this early, but of those patients of whom we have knowledge, less than 10 per cent have given evidence of persistence of the parasite in the intestine and we feel hopeful that judicious varying of "ammunition" will ultimately result favorably in most of that 10 per cent.

We have found it advantageous to attack first with emetine, administered subcutaneously, and with treparsol administered orally. If there is recurrence, it seems better not to persist with these drugs but to turn to yatren, perhaps in conjunction with large doses of bismuth given orally. In our experience, medicated enemas or irrigations have not seemed of enough value to warrant their routine use. It is true that the older method of treatment in which kerosene enemas were given, in conjunction with emetine, have given good results in some instances. If infestation still persists after a course of yatren (3 gm. daily for a week and repeated after an interval of a week), then administration of emetine and treparsol may be repeated.

Dangers of treatment.—In no wise do we wish to minimize the fact that use both of emetine and of the arsenical preparations entails danger,

but respect for this fact permits us to use the two most efficient weapons that we possess to combat this disease; emetine controls the acute manifestations while arsenic is more effective in eradicating the ameba. We are not attempting to make any final statement nor to review reports of such excellent work as has been carried out by Leake and Read, but we wish merely to present our own experiences.

For approximately fifteen years, emetine has been used at the clinic without causing a death. Peripheral neuritis has resulted in only one case, and in that case the patient later recalled that he had received emetine shortly before he came to the clinic. We do not select the patients who are to receive emetine, nor do we hospitalize the patients unless their general condition demands it. Years ago, Logan instituted the regimen of administering 1 grain (0.065 gm.) of emetine hydrochloride (Burroughs-Wellcome) subcutaneously twice daily for three days. This successfully controls acute manifestations of the disease. For children, or for elderly, debilitated patients, the dose is kept to $\frac{1}{3}$ or $\frac{2}{3}$ of a grain (0.02 or 0.043 gm.) twice daily. After an interval of a week, this course of 4 to 6 grains (0.24 to 0.40 gm.) is repeated. Formerly, we gave a third course after a second interval of two weeks, but now we seldom use more than two courses, for that is adequate to control the active phases. Using a carefully prepared product, giving it subcutaneously, and allowing a period of rest between courses, are the probable reasons for our avoidance of complications with emetine. In addition, the patients are always held under close observation.

The same principles apply to the use of the arsenical preparations. The first orally administered arsenical preparation, stovarsol, proved efficient, but in about 3 per cent of the cases toxic erythema developed, and we encountered two cases of peripheral neuritis in which arsenic persisted in the urine six months after administration of the drug had been discontinued. Treparsol is equally efficient, and also produces toxic reactions in 3 per cent of cases, but it is rapidly eliminated, so that in seven years we have had no cases of peripheral neuritis. We have used treparsol in conjunction with emetine in all proved or suspected cases of hepatic abscess, without untoward results. The dose is 0.25 gm. with each meal for four days; at intervals of ten

days, two more such courses are administered. Administration of emetine and arsenic are started at the same time. Our experience with carbarsone is too limited to justify our expressing an opinion concerning it, although it has seemed less efficient in our hands than treparsol. Also, it is eliminated slowly, as is stovarsol, and this slow elimination may result in neuritis. One such case has been reported to us. Because deaths have been reported elsewhere, from the use of either treparsol or stovarsol, we must reemphasize the necessity of stopping administration of the drug at even a suspicion of intolerance. If toxic phenomena develop, arsenic should never be used again.

It is our impression that both emetine and treparsol can produce reactions, especially the early acute manifestations, on an allergic basis. Certainly, we have used both drugs enough years to eliminate the thought of excess dosage, and we believe that the reaction is the result of drug allergy.

Yatren, which is essentially sodium iodoxy-quinoline sulphonate, usually produces increased diarrhea in the recommended dose of 3 gm. daily, and this dose must often be decreased by half. A few instances of jaundice have been reported. Other than these by effects, we know of no difficulties with yatren. Vioform is similar to yatren. We have not used it enough to justify us in expressing an opinion, although our brief experience with it is that it is less effective than yatren.

Probably one could summarize the question of danger by stating that emetine and arsenic are poisons; with proper dosage and supervised courses, the danger is minimal, and, in those cases in which reactions do occur, they may be more on a basis of drug allergy than on one of actual overdosage. It is wise to inquire concerning any known personal or familial allergic phenomena, and to be especially watchful in cases in which the history is positive.

Summary

Amebiasis is a world-wide disease, with an average incidence in the United States of from about 5 to 10 per cent, according to geographical situation. Absolute diagnosis rests on identification of the parasite in stools or in the discharge from sinuses. The disease is transmitted from

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host to host by transference of cysts. The cyst is killed rapidly by drying or heating but lives long in water, even though the water is chlorinated. The microorganisms are not as commonly distributed by food-handlers or on raw vegetables as formerly was believed.

Conformity to regulations about cross connections between water supplies and sewage systems is essential to control amebiasis. Suitable and varied treatment results in apparent cures in a high percentage of cases encountered in the north temperate zone. Although emetine and

treparsol are definite poisons, careful and supervised use of them constitute the most satisfactory treatment with which we are familiar. Carriers, as well as persons who have active amebiasis, can transmit the causative organism. However, as has been indicated, if such persons take care with personal cleanliness, and if sanitary regulations are followed in their communities, the menace which they constitute is less than that offered by carriers of, or by persons who are actively ill with, most other infectious diseases.

TREATMENT OF HEAD INJURIES*

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IN head injuries, it cannot be too often emphasized that it is the damage to the brain and its blood vessels and not the fracture of the skull which determines the seriousness of the case.

Brain injuries resulting from trauma are classified as concussion, contusion, laceration, edema and compression from hemorrhage. Any or all may be present in any one case. Each must be treated individually according to the findings and indications present.

A short period of unconsciousness is a favorable sign regardless of the apparent severity of the head injury. When coma is deepening, it is evidence that the patient is growing worse. The longer unconsciousness lasts, the more guarded must be the prognosis for ultimate or complete recovery. Because the brain is enclosed in a bony cavity incapable of expansion, the pressure resulting from hemorrhage and edema causes serious damage and sometimes death. In critical cases the patient's pulse, respiration, temperature and blood pressure should be taken and recorded every thirty minutes during the first twenty-four hours or more. If any significant changes occur, the attending physician should be immediately notified in order that he may institute treatment to counteract the increasing intracranial pressure before it is too late.

Following head injuries, pallor, sweating, a

rapid, thready pulse, dilated pupils, low blood pressure and subnormal temperature, we know indicate shock. Shock, in head injuries, may be greatly aggravated by trauma to the limbs or abdomen and by the loss of blood from lacerations of the head or elsewhere. Our first attention should be directed toward arrest of bleeding from any external lacerations. The treatment of shock should be started at the earliest possible moment. Heat should be applied and cardiac stimulants given. Caffeine sodium benzoate is an excellent stimulant and has the added advantage of reducing the intracranial pressure. Dr. Donald Munro of Boston and others advocate giving from 50 to 100 c.c. of a 50 per cent solution of glucose intravenously at intervals of three hours if needed. The hypertonic glucose solution recalls into the blood stream the blood serum which has leaked into the tissues because of shock. The same osmotic flow that recalls the serum lost in the tissue fluids and corrects shock also reduces the edema in the brain. Blood transfusions should be given as early as possible when needed.

Examine and record the presence or absence of all normal and pathological reflexes. Compare the two sides of the body to see if there is muscle weakness or paralysis in any part of the body. The detection of partial hemiplegia is often possible in unconscious patients through observation of the movements of the extremities during restless periods or the movements caused

*Read before the Ramsey County Medical Society, November 26, 1934.

by irritating stimulation. If there is early paralysis, it usually means cortical laceration in the motor area and should be distinguished from paralysis appearing later which is probably due to increasing local hemorrhage.

Get all the history possible as to whether or not there was a short or long period of unconsciousness immediately after the injury, also keep in mind that a patient may have become unconscious from some condition as apoplexy, uremia, acidosis, etc. While unconscious, he may have fallen off a ladder or down stairs, or his uncontrolled automobile may have crashed, giving all the evidence of an ordinary accident, whereas the patient's unconsciousness may be due to a diabetic coma or apoplexy, upon which a head trauma has been superimposed.

Semiconscious patients are sensitive to and annoyed by noises, so they should be placed in a quiet room by themselves. Restlessness and irrational acts are probably caused by severe headache. If put in restraints and immobilized, they will fight. Have canvas or other protection placed on the sides of the bed so they cannot fall out but can move their limbs. They are best comforted and given necessary restraint by an intelligent special nurse. An ice cap on the head is a comfort to the patient and to those friends who insist that everything be done. The patient should be kept quiet and have no visitors. Never give morphine under any circumstances as it is a respiratory depressant and it may stop respiration, even when given in small doses. Morphine masks pupillary reactions and other symptoms.

Phenobarbital subcutaneously acts well to control undue restlessness. Lumbar spinal drainage, by reducing intracranial pressure, relieves headache. Blood in the spinal fluid indicates that there has been hemorrhage into the subarachnoid space. Withdrawal of as much of this blood as possible will diminish the irritation caused by it and reduce the amount of adhesions formed between the pia and arachnoid. These adhesions interfere with the circulation of the cerebrospinal fluid, causing post-traumatic headaches and dizziness. The cerebro-spinal pressure should always be taken with a manometer as this is the only way of accurately judging the pressure. If a mercury manometer is used, the normal pressure should be about 10. If the pressure is above this, enough fluid should be withdrawn to

bring the pressure down to 10 unless the pressure is unusually high (30 or over), in which case the pressure should be reduced to about one-half the initial pressure. Spinal drainage may be repeated at intervals of three to twenty-four hours as indicated by the symptoms. Novocaine should be used to avoid irritating the patient. When the spinal needle is introduced, cerebrospinal fluid should be withdrawn slowly as the rapid withdrawal of large amounts may tend to encourage bleeding in the early stages. There is also some danger that the medulla may be pressed into the foramen magnum, causing inhibition of respiration.

The intracranial pressure may be reduced for about three hours by dehydration with 50 to 100 c.c. of a 50 per cent solution of glucose given intravenously. If given in larger doses, there may be a secondary rise of pressure.

At the laboratory of physiology at the Harvard Medical School, it has been demonstrated experimentally in dogs that the administration of 3-8 grams per kilo of a 50 per cent solution of sucrose will reduce the cerebrospinal pressure without a secondary rise.*

The most efficient drug for reducing the intracranial pressure by dehydration is magnesium sulphate given as a retention enema. From two to four ounces of the saturated solution should be given slowly by gravity through a soft number 10 French catheter. Repeat the enemas every three hours for four doses, then wait twelve hours before starting them again or the patient may develop a toxic dehydration with subnormal intracranial pressure. Magnesium sulphate can be given by mouth but it often causes vomiting. If a patient cannot retain magnesium sulphate by mouth or rectum, it can be given as a 2 per cent solution intravenously. Never dehydrate with intravenous hypertonic salt solution. It dehydrates rapidly but there is a secondary rise of the intracranial pressure to a higher level than before the solution was given.

Restriction of fluids is essential while acute symptoms are present and for a time after they have subsided, but in the most extreme cases they should not be reduced below 500 c.c. in twenty-four hours.

*Since this article was written, Lilly and Co. have marketed a 50 per cent solution of sucrose in 100 c.c. glass ampules which we are now using instead of glucose.

There is considerable controversy as to the use of spinal drainage and the intravenous use of hypertonic solutions of glucose to reduce intracranial pressure. I believe that the majority of clinics treating large numbers of traumatic head injuries use the following methods in selected cases: (1) spinal drainage; (2) intravenous glucose; (3) magnesium sulphate rectally, orally or intravenously; (4) restriction of fluid intake.

The taking of x-ray pictures should be deferred until the patient has recovered from shock. Good x-ray pictures cannot be taken when the patient is restless and resistive. Stereoscopic pictures should always be taken with a technic which will give good black and white contrast. Fractures will show better in black and white films than in gray films. Expert x-ray interpretation is essential.

When dilatation and fixation of both pupils are present, an unfavorable prognosis should be given. A choked disk usually does not appear until twenty-four to forty-eight hours after injury, which is too late to be of diagnostic value in the early stages. When one pupil only is dilated, it is a suggestive, but not a positive sign that the greatest damage has been done on that side.

A pulse in the sixties should be closely watched. In the fifties, it is a definite indication of a high intracranial pressure. If it goes down into the forties, it should arouse grave apprehensions. When a pulse which has been slow starts to go up gradually, it is a favorable sign, but if it goes up rapidly and especially if the temperature also goes up, the patient will probably die from edema of the medulla with respiratory failure. A temperature which at first is subnormal but which rises to normal or above is a favorable sign. Continued subnormal temperature indicates continued shock and is a grave prognostic sign. A rapidly rising temperature to 105 or 106 degrees indicates impending death. A temperature of 102 degrees or less is favorable. A low blood pressure indicates shock, a high blood pressure or a high pulse pressure indicates a high intracranial pressure. A slow respiration of fifteen or under indicates a high intracranial pressure. In the terminal stages of fatal head injuries, we have the syndrome of loss of consciousness, rapidly rising pulse and temperature with rapid, shallow and irregular respiration.

A left sided temporal injury with speech disturbance is an important localizing sign which is sometimes overlooked when a patient is recovering from stupor or coma. The patient may look as if he understood but does not reply because of his inability to speak. If a fracture involves the middle or inner ear, we may have escape of blood or cerebrospinal fluid through the external auditory canal. The canal should never be irrigated because this may force infection into the brain through the fracture opening. The canal should not be packed. The entire injured ear should be covered and turned down on the pillow to encourage drainage.

Loss of the sense of smell is a localizing sign for frontal lobe injury or tearing of the olfactory nerve filaments. In a fracture across the sinuses and ethmoidal cells with rupture of the dura and arachnoid, there will be dripping of blood and cerebrospinal fluid from the nose. In such a case, effort should be directed toward reducing the intracranial pressure in the hope that a clot or exudate may seal the opening. The nasal cavity should never be irrigated and the patient should not be allowed to blow his nose for fear of forcing air and infected secretions into the cranial cavity.

In compound fractures of the skull, stop the hemorrhage first. If the patient is in shock, apply a sterile dressing and treat the shock. If the patient cannot survive the shock, he will have still less chance of recovery if the trauma and hemorrhage of an operation are added. After the patient has recovered from shock, has been grouped for possibly needed transfusion, and the operative conditions made ideal, the parts should be shaved, cleaned with ether, and antiseptics applied. Under local anesthesia the wound should then be debrided by incising through normal tissue down to the bone.

Depressed fractures over the longitudinal or lateral sinuses may be plugging a laceration in the sinus. If the plugging bone fragment is removed, a severe hemorrhage may result. Detached or depressed pieces of the skull can best be managed by trephining an opening in the normal bone adjacent to the fracture line and removing enough of the normal bone so the fractured pieces can be removed without further injury to the brain or its coverings. Detached or depressed fractures in the frontoparietal re-

gions should be carefully cleaned, elevated and readjusted. If osteomyelitis does not develop, the resulting protective, psychologic and cosmetic values will be real accomplishments. Slightly depressed fractures without focal symptoms and especially when not over the motor areas may be treated conservatively. When the dura is lacerated, debride it. If there is a blood clot, suck it out, using a small sized glass drinking tube attached to a suction apparatus. Be sure to suck out all dead tissue, blood and debris. This will cause more bleeding at first but it will gradually stop. At last there will be only one or two bleeding points which can be controlled by electro-coagulation, silver clips or muscle graft transplants. Complete hemostasis is essential as no drainage should be used. Draining the ventricles will help to stop troublesome, venous bleeding by permitting collapse of the brain.

Any portion of the brain left uncovered by dura may be covered by a fascia lata transplant or a piece of Cargile membrane. The scalp can be approximated easier over the vertex by tripod plastic incisions and flaps than by right angled flaps. If there is a bony defect, it must be covered with good scalp even if a flap must be turned to cover it. Use two layers of fine interrupted silk sutures, one in the galea and the other in the skin. After the sutures have been tied, scarify the flaps near the suture line down to, but not through, the galea. This will permit the escape of serum, prevent edema, and give a higher percentage of primary union. In compound fractures of the skull, spinal drainage may create a negative pressure and draw infected material through the dural tear, causing meningitis. Some give urotropin, believing it acts as an intracranial antiseptic.

Extradural and subdural hemorrhages must be diagnosed early, for in the great majority of cases, operation offers the only chance of recovery. They are usually caused by fractures of the temporal bone and may be on the side opposite the point of impact. Of all traumatic conditions causing increased intracranial pressure, extradural hemorrhage from the middle meningeal artery is the most important. As the hematoma enlarges, it strips the dura from the skull, causing gradually increasing compression of the brain. When the main trunk or a large branch of the middle meningeal artery is torn, the hemorrhage

may be so rapid that it may cause death in two hours or less. The bleeding from a smaller branch may be so slow that it may require several days for the clot to become large enough to jeopardize the patient's life. When a patient sustains a head injury, is unconscious for a short time, regains consciousness, then becomes progressively more drowsy and finally comatose, we must consider a gradually increasing hematoma. The clear interval varies in duration from a few minutes to several hours or days, depending on the rapidity of the hemorrhage and duration of the concussion. An x-ray finding of fracture in either temporal areas or the base would help to confirm the probable correctness of this diagnosis. As the hematoma gradually increases from the temporal region upward, it involves first the face, as evidenced by some lagging of the muscles of the opposite side. Next there will develop a weakness in the opposite hand and arm. Later the leg becomes weak, a Babinski may be present, and the pupil may dilate on the same side as the hematoma.

When we have a progressively increasing paralysis with signs of increasing intracranial pressure such as headache, restlessness, vomiting, increasing coma, loss of sphincteric control, slow pulse and respiration, we have a perfect picture of extradural or subdural hematoma calling for immediate, proper surgery. Should there be any doubt as to the presence of extradural or subdural hemorrhage from the clinical signs and symptoms when the patient's condition is serious, an exploratory opening should be made through the skull in the temporal region on the suspected side. The entire head should be shaved and prepared so if no blood is found on the first side explored, the opposite side can be explored without delay. If no extradural blood is found, the dura should be opened, when a considerable amount of cerebro-spinal fluid or blood may escape. A soft rubber drain through the subtemporal opening will serve as a splendid decompressing measure. If no blood is found extra- or subdurally, an exploring cannula may be introduced into the substance of the brain for the purpose of locating and draining a possible subcortical collection of blood.

All patients, whether operated upon or not, who have sustained head injuries severe enough to have rendered them unconscious for one hour

or more should be confined to bed for two weeks after their cerebro-spinal pressure has been normal as shown by the manometer on two successive days. This arbitrary period of two weeks' rest is required to give the delicate physiological balance of the cerebro-spinal system time to re-establish itself. After the two weeks' rest period, the patients may sit up and be about as much as they feel able. They should not be allowed to go home until they have become suffi-

ciently strong to walk up two flights of stairs. This will help them combat the psychology of having friends come and tell them they have known of people who have become insane, who have continuous headaches, and have been unable to work after similar accidents. If these patients are given too much sympathy and attention they are likely to become chronic invalids. These patients should be encouraged to gradually resume their activities as soon as possible.

DYSMENORRHEA*

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DYSMENORRHEA is not a disease. It is in reality only a symptom of some underlying pelvic or constitutional disturbance. Two types of dysmenorrhea are recognized: (1) the primary or essential; and (2) the secondary or acquired. The primary type occurs without demonstrable pathology while the secondary or acquired type may be caused by ovarian tumors, uterine myomas, endometriosis, uterine displacements or other pelvic lesions.

Frequency.—In 1877, Mary Jacobi¹⁸ found that 46 per cent of women complained of menstrual pain. In 1913, in a study of 100 women by a questionnaire, Chisholm⁴ found that 77 per cent suffered some pain during their periods. However, the pain was incapacitating in only 3 per cent of the cases. Margaret Sturgis³² in 1923 in an investigation of the menstrual history of 2,077 employed women, reported 14.7 per cent as having pain with their periods. However, only 2.2 per cent were incapacitated. Elizabeth Van Duyne³³ observed 3,077 women at Goucher College from 1900 to 1907. She found dysmenorrhea in 7.1 per cent, which was later reduced to 3 per cent by a more general and systematic physical training. Norman Miller²³ studied 785 college women and nurses in 1930. Forty-seven per cent complained of menstrual pain; however, only 17 per cent were severely handicapped.

Etiology.—We are still very much in the dark

as to the exact etiology of primary or essential dysmenorrhea. A maze of theories has been advanced in explanation of the causation of the severe pain. The pain is quite similar to that occurring in gallstone or ureteral stone colic; in fact, it is typical smooth muscle pain.

For years the pain in dysmenorrhea was believed to be caused by an obstruction or congenital stenosis of the cervix, which prevented the free exit of the menstrual blood from the interior of the uterus. Mackintosh²⁰ advanced this theory in 1832; his cause was warmly championed by James Y. Simpson and J. Marion Sims.

W. Blair Bell² and others regard an acute ante flexion of the uterus as the chief causative factor in the production of dysmenorrhea. Herman¹⁶ denies that ante flexion is a cause. C. Jeff Miller²² has this to say of ante flexion:

"Ante flexion of the uterus is associated with dysmenorrhea sufficiently often to make it seem that there is some specific relationship between the two conditions. All ante flexions, it is true, are not accompanied by dysmenorrhea, and both types of pathology are so frequent that the coincidental occurrence, at least in a certain percentage of cases, can be explained by the law of averages; but the fact remains that the association is very frequent and that ante flexion undoubtedly is the explanation of some cases, at least. Retrocession is often present with the ante flexion, and the whole uterine musculature is markedly relaxed. Endometrial hypertrophy is a frequent though not a constant finding, and associated sterility is quite general. There is often evident a distinct cicatricial band at the internal os, though actual stenosis, as has already

*Read before the Southern Minnesota Medical Association, Faribault, Minnesota, August 24, 1934.

been noted, cannot be demonstrated. Moderate degrees of hypoplasia are frequent in association with a long, conical cervix, the whole organ assuming the appearance of the letter J, and other developmental errors of the supporting structures of the kidney or colon are often evident also. The hypoplasia, according to Graves, may be considered secondary to the malposition, which develops at puberty, as the result of some tissue defect, and retards the full growth of the uterus by a partial interference with the blood supply."

Hypoplasia.—A defective development of the pelvic organs is frequently observed in dysmenorrhea. The uterus is infantile in type; the cervix represents three-fifths of the total uterine length. Sterility is common in this class of cases. In fact, the infantile uterus, dysmenorrhea and sterility is a common gynecological triad.

The pain occurring in the infantile uterus has been explained: (1) by obstruction, due to the cervical stenosis; (2) by the uterine cavity being too small to accommodate itself to the menstrual swelling of the endometrium, which acts as a foreign body. Attempts of the uterus to expel its own lining results in the colicky pain so characteristic of dysmenorrhea.

Schultz³¹ considers the pain in the hypoplastic uterus as due to the failure of the myometrium to empty the uterine veins during the physiological hyperemia accompanying menstruation. This results in a venous stasis with pressure on the uterine nerves.

Döderlein⁹ considered a hyperesthesia of the uterine mucosa a basis for many cases of dysmenorrhea.

Dysmenorrhea may, at times, be distinctly neurotic in origin, which may be the fault of poor heredity, or the patient may be the victim of suggestion from a too solicitous mother, by whom she is informed that pain during the periods is to be expected. She is put to bed with a hot water bottle and given a drink of brandy to await the arrival of the menstrual pains, which, if she be an impressionable type, are almost certain to materialize. Menge²¹ considers dysmenorrhea merely an exaggeration of the normal physiologic uterine contractions, which cause no pain in women of sound nervous temperaments. J. Novak and Harnik²⁷ believe that all cases of essential dysmenorrhea are neurotic in origin and that careful investiga-

tion will reveal that some psychic trauma, many times sexual in nature, is the basis of the first attack. The recurrence of subsequent monthly attacks is a result of the anxiety and fear thus subconsciously associated with the menstrual function. Cure may be accomplished by gaining the confidence of the patient and making her realize that her monthly attacks of pain result from a state of her subconscious reflexes rather than any disease of the pelvic organs. They report 168 cases treated by psychic re-education. Seventy-one were completely cured and eighty-nine markedly improved.

Hormonal Theory.—Dysmenorrhea may at times be encountered in patients with definite endocrine disorders. Usually this is not the case. Administration of thyroid, pituitary, ovarian and mammary extracts have only too often ended in miserable failure. However, recent investigation by Novak and Reynolds²⁶ promises to throw considerable light upon the hormonal origin of primary dysmenorrhea. By experiments on rabbits' uteri they have shown that folliculin or theelin is responsible for uterine motility. Experiments with other endocrine preparations demonstrated that theelin alone possessed the property of stimulating uterine muscle contractions. It was also found that the injection of the urine of pregnant women as well as progestin inhibited uterine motility. As a result of their experiments these authors agree that whatever the underlying cause of primary dysmenorrhea may be, the immediate cause is a spasmodic contraction of uterine muscle. These contractions are in turn the result of the withdrawal of corpus luteum (progestin) activity with an ascendancy of theelin or folliculin, which according to Frank¹⁵ reaches its greatest concentration in the blood stream during the premenstrual and early menstrual phase.

A form of dysmenorrhea of special interest is the so-called nasal dysmenorrhea first described by Fliess¹² in 1893. Fliess described genital spots in the nose consisting of erectile tissue situated on the anterior end of the inferior turbinate and on the tubercle of the nasal septum. According to Fliess these spots become swollen, congested and hypersensitive during menstruation. He distinguished two types of dysmenorrhea, one in which the pain disappeared with

the appearance of the menstrual flow, the other in which the pain continued. The first type, he believed due to cervical stenosis; the second type included numerous patients in whom co-cainization of the genital spots caused immediate cessation of the menstrual pain. Permanent relief from nasal dysmenorrhea was often possible by cauterizing the genital spots by galvano cautery, electrolysis or trichloroacetic acid. Schiff²⁰ later confirmed Fliess's observations and stated that 72 per cent of all types of dysmenorrhea yielded to this treatment.

Treatment.—The treatment of secondary or acquired dysmenorrhea requires very little comment. Its cure is effected by removing or correcting the cause. The treatment of essential or primary dysmenorrhea is quite unsatisfactory and will remain more or less empirical until the causes of this type are more fully investigated. We are all agreed that a full-term pregnancy effects a physiological cure in the great majority of cases. Unfortunately dysmenorrhea develops in girls too young to consider marriage and pregnancy. Although marriage may be recommended, not all dysmenorrhea victims are sufficiently beautiful or wealthy to obtain a husband at will.

Fortunately only from 2 to 3 per cent of the women are totally incapacitated by the menstrual pain. In this small percentage of cases the pain, however, is very severe. Relief is demanded from their physician and obtained usually in the form of morphine, gr. $\frac{1}{8}$ to $\frac{1}{4}$ hypodermically. This is a dangerous drug to use, leading in many instances to drug addiction. Litzberg²¹ at the recommendation of Macht, has employed a 20 per cent emulsion of benzyl benzoate in 2 drachm doses every four hours. Success was obtainable in 62.7 per cent of the cases reported. Antipyrine grs. iii and aspirin grs. X every four hours, also sodium amytal in $1\frac{1}{2}$ to 3 grain doses every six hours, have given the writer excellent results. Bromides in appropriate doses succeed at times, especially in the neurotic patient, after all other measures have failed to give relief. Novak²⁴ obtained excellent results with 1/100 grain atropine by mouth every six hours. Since nausea and vomiting are quite frequent in dysmenorrhea, it may be necessary to administer the medication by rectum. The writer has obtained gratifying results with 1/32 to 1/16 grain dilaudid rectal suppositories every

six to eight hours. Authorities claim the drug is not habit-forming. In 1910 Drenkhahn¹⁰ reported good results in the control of menstrual pain by the injection of 1 mg. of atropin dissolved in 1 c.c. of sterile water directly into the cervical canal.

Many cases of dysmenorrhea are helped markedly by better hygiene. Norman Miller reports a marked lessening of the number of cases of dysmenorrhea in college girls and nurses through improvement in posture and muscle tonus through proper exercises. Careful regulation of the bowels is important from three days to a week before the onset of the period. Change in occupation is at times beneficial. Someone has facetiously remarked that the rich woman should be put to work and the poor working girl should be sent to the seashore. For the temporary relief of dysmenorrhea Novak²⁵ recommends the intramuscular injection of 100 rat units of Parke, Davis and Company Antuitrin S, one to two days before menstruation, which may be repeated in one to two days, depending upon the severity of the dysmenorrhea. For permanent relief he recommends the hypodermic administration of 50 rat units of theelin on alternate days for six days, beginning the injections one day after the finish of the menstrual period.

X-ray Irradiation.—Drips¹¹ and Ford¹⁴ recommend irradiation of the ovaries and hypophysis for dysmenorrhea. The dosage is 5 per cent of an erythema dose of well-filtered rays produced by high potentials applied at the depth of the ovary or pituitary gland. Ford¹⁴ in a series of twenty-nine cases reports relief in eighteen. The good results were attributed to the selective destruction of unhealthy or atretic ovarian follicles.

Dilatation of the cervix has always been a popular method for the relief of dysmenorrhea. Thousands of cervixes are dilated every year. The relief obtained, however, is usually only temporary, rarely lasting more than six months. Dilatation of the cervix was first carried out in the United States by Dewees in 1826.⁸ C. Jeff Miller²² has the following to say of cervical dilatation:

"In the line of operative treatment, however much we may decry the procedure, dilatation, with or without curettage, still remains the commonest form of

treatment and probably gives the highest percentage of temporary and permanent cures. Whether the pain is due to a spasmodic contraction of the circular fibers at the internal os, to an undue amount of connective tissue at this point, or to another and entirely extrapelvic cause we have no way of determining, and it must be granted that the employment of a method which is strictly local for correction of a condition which may or may not be local in origin is entirely illogical and empiric. On the other hand, common sense must be invoked; what our patients are after, as Howard Kelly wisely remarks, is relief with or without a sound theory behind the method by which it is secured, and we have no right to quarrel with any measure, however irrational and illogical it may be, which achieves results. Dilatation and curettage in my hands has yielded decidedly better results than any other method I have employed, approximately 40 per cent of permanent cures, to which must be added at least 30 per cent of partial or temporary cures.

"The gynecologist who bases his objections to this procedure on strictly academic grounds forgets that even temporary relief from dysmenorrhea is usually very gratefully received by the woman who suffers from it. More than one patient has told me that the months of relief thus afforded her have enabled her to get her physical and nervous balance, so to speak, so that when the dysmenorrhea recurred—and the recurrence is frequently of a less severe type—the monthly ordeal was by no means so trying. This is a very important consideration. It is easy to conceive, as has already been pointed out, that with the constant recurrence of pain, which is often very severe if not actually disabling, nervous exhaustion is likely to follow, and that, as time goes on, the effect of each period will last longer and the reaction from it will be less prompt, so that eventually a constant nervous irritation is maintained and the patient becomes thoroughly neurotic, though it would be most unfair to say that her neurosis is primary. For my own part, I do not believe that even a definite neurasthenia contraindicates the performance of dilatation and curettage, provided that the pain is of the typical type and that the pelvic findings furnish the proper indication.

"The operation should be done only in the cases in which the uterus is of the typical anteverted, hypoplastic type and in which there is no other pelvic pathology such as retroflexion, tumors or inflammatory disease to explain the menstrual pain."

Carstens³ recommends the introduction of a silver Chamber's spring stem pessary into the cervix following dilatation. He claims a marked development of the hypoplastic type of uterus through constant uterine contractions caused by the spring pessary. The writer has used the Chamber's spring pessary in several cases with excellent results, but fear of infection has caused him to discontinue its use.

Menge²¹ recommends dilatation of the cervix with a longitudinal section of the internal os with a bistoury. Celand⁵ describes a similar procedure using a bistoury knife to make longitudinal incisions in the internal sphincter of the os 1/12 to 1/16 inch deep after a preliminary dilatation of the cervix. After the two lateral incisions are made the cervix is again dilated up to a number 15 Hegar dilator. The uterine cavity and the cervix are then firmly packed with iodoform gauze, which is removed at the end of ten days. He reports less than 5 per cent failures in 230 cases. The writer has used this operation a number of times with marked success. Instead of using but two lateral incisions the writer makes multiple longitudinal incisions through the internal sphincter and leaves the iodoform packing in the uterus but five days because several of the patients had a rise of temperature after this time. Danger of infection is minimized if the uterine cavity is not curetted.

Dudley's operation consists in cutting the cervix posteriorly up to the level of the internal os. The lower edges of the incision are sutured to the upper end of the incision. Pozzi²⁸ recommends incising the cervix bilaterally up to the level of the internal os. W. Blair Bell² describes an operation in which he dissects the bladder from the cervix anteriorly; then dilates the cervical canal and splits the cervix in front, carrying the incision well up into the uterine cavity. The superficial longitudinal fibers of the uterus are sutured over the incised cervical canal, thus leaving the deeper portion of the incision unsutured. The bladder and the vaginal mucosa are then sutured to their original position.

Section of the Presacral Nerve.—In 1898 Jaboulay¹⁷ attempted to relieve pelvic pain by interrupting the afferent paths in the sacral sympathetic chains. In 1899 Ruggi²⁹ published his interesting work on abdominal sympathectomy in functional disturbances of the female organs. In 1925 Cotte⁶ sectioned the superior hypogastric plexus (presacral nerve of Latarjet) for pain in cases of functional dysmenorrhea. In 1929 he reported 200 cases with excellent results. In 1930 Fontaine¹³ and Herrmann reported twenty-two cases of section of the presacral nerve. DeCourcy⁷ of Cincinnati reports

a series of twenty-one cases in which he sectioned the presacral nerve for dysmenorrhea with excellent results. Adson and Masson¹ of the Mayo Clinic in 1931 report six cases of resection of the presacral nerve for dysmenorrhea with favorable results. DeCourcy⁷ describes the operation as follows:

"The patient being anesthetized and placed upon the table, the cervix is dilated. She is then placed in the Trendelenburg position, and a left rectus incision made close to the midline, extending from the pubic bone to a point about one inch above the umbilicus. Packing is placed to keep the intestines upward, but the sigmoid is retracted to the left. The uterus and ovaries should be inspected, and if any pathologic conditions, such as cysts or retroversion, are in evidence, correction is undertaken before proceeding with the nerve section.

"Usually, as soon as the promontory of the sacrum is uncovered, it is possible to see the fibers of the presacral nerve crossing the left iliac vein. The posterior parietal peritoneum is next opened by an incision bisecting the pelvic triangle which lies between the right iliac artery and the left iliac vein. All the fibers in this triangle are picked up upon a ligature carrier or other suitable implement, and entirely stripped away, care being exercised not to omit any fiber, however insignificant. There is little or no bleeding, but any points which are evident should be ligated. The peritoneum is then closed. It is my routine practice to remove the appendix, if present, after which the abdomen is sutured in the usual manner.

Postoperative Results

"The immediate results of this procedure have been excellent, and in no instance has the pain failed of relief. Menstruation regularly takes place within forty-eight to seventy-two hours after operation, no matter what time in the menstrual cycle it has been performed. Most of the patients have had to be catheterized for two or three days, but the inhibition of bladder function has been no more marked than after any other gynecologic operation. Cotte claims that in the majority of his cases, which at the latest reports numbered over a hundred, micturition was easier and the output of urine greater than is usual after any sort of pelvic procedure. None of my patients have had any difficulty with the bladder afterward, although the possibility of some interference with vesical function has always been kept in mind. Several of my patients have since become pregnant, demonstrating that there is no interference with childbearing."

In the writer's opinion this operation, in spite of its enthusiastic reception, should be reserved for those cases of intractable dysmenorrhea where all other remedial measures have failed.

Summary

1. Two types of dysmenorrhea are recognized: the primary or essential, which occurs without demonstrable pathology, and the secondary or acquired type, which may be caused by ovarian tumors, uterine myomas, endometriosis, uterine displacements or other pelvic lesions.

2. According to different investigators the frequency of pain during menstruation varies from 7.1 to 77 per cent; the number severely handicapped by the pain varies from 2.2 to 17 per cent.

3. The etiology of primary or essential dysmenorrhea has not been satisfactorily determined.

4. Some of the causes advanced in explanation of dysmenorrhea are: stenosis of the cervix, acute antelexion of the uterus, hypoplasia of the uterus, neurosis, and disturbances of the endocrine glands.

5. Recent investigations of Novak and Reynolds tend to support a hormonal origin of primary dysmenorrhea.

6. A form of dysmenorrhea of special interest is the so-called nasal dysmenorrhea first described by Fliess.

7. Treatment of primary dysmenorrhea will remain unsatisfactory until the cause is definitely determined.

8. Antituitrin S (Parke, Davis and Company) for temporary relief of pain and the administration of theelin for permanent relief seems at present to be the most logical medical treatment.

9. Irradiation of the ovaries and hypophysis with small doses of x-ray have given excellent results in the treatment of dysmenorrhea.

10. Dilatation of the cervix according to the technic of Cleland seems to offer the greatest percentage of permanent cures by means of a minor operation.

11. The intra-uterine stem and glass pessaries are dangerous remedies. They invite infection.

12. In case of a failure of simple surgical measures, section of the presacral nerve (superior hypogastric plexus) according to the technic of Cotte is recommended.

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NON-ORGANIC CAUSES OF FATIGUE*

A Concept of Fundamentals

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FOR most of us, life had already begun when death claimed one whose discoveries and investigations added more to our present understanding of human diseases than did the contributions of almost any five scientists you might name. It was Louis Pasteur whose theories concerning the causation and communicable nature of certain diseases were so admirably supported by his experimental evidence that the world had to listen and learn. His brilliant work formed the foundation for our present understanding of infectious diseases and states; our rapid advances in surgery; much of our public health work and preventive medicine; the effectiveness of immunology; our interest in the control of supplies of milk, water, and foodstuffs; and innumerable ramifications which could be listed.

But however valuable to humankind we may judge the effort of this one man in the fields mentioned, it is apparent that one teaching of his has thus far either escaped notice or has been underrated; and this teaching may contain as much of value for the growth of medicine as any or all of his better known contributions.

His statement was simple, but full of implication and capable of tremendous expansion into specific field of endeavor. He taught that "without theory, practice is mere routine born of habit."

Immediately arises the question: What percentage of persons presenting themselves to us for help receive only that which they have been trained to expect—an habitual routine? And is this routine adequate to meet all ills? Do we attack all of these problems with minds habitually closed to possibilities of physiological disturbance not strictly in accord with the traditional teachings of cause and effect received in our schooling? Are we so easily satisfied with a ready answer that we miss the truth?

If we are interested in this kind of self-examination, it may be profitable to examine first the routine into which we have been moulded.

Visualize our world! In those quarters of the globe most familiar to us, the vast majority of humankind attack the problem of Life with one conviction dominant—that the maximum satisfaction to be obtained from life is directly proportionate to the degree of material accumulation. So nations, municipalities, and individuals devote inordinate amounts of time, thought, and energy to economics as a cure-all for the World's ills. Consider Science! The intelligence and ingenuity of mankind is applied to the search for Truth concerning the natural laws governing his Universe. "Nature is governed only by learning to obey her." Thus far man's ingenuity has developed capacity for profitable investigation *only* in those fields where his five senses may be utilized; that is, in the material or tangible spheres such as chemistry, electricity, hydrostatics, physics. Man may toy with the intangibles of life, but his reasoning ability is as yet too immature to establish facts from his theories. Whereas, could he but appreciate it, the intangibles of life may be of far greater importance to him than the tangibles. At least our present exclusive emphasis on tangibles seems to have produced a world definitely out of balance.

Remember your medical training! Presumably it dealt almost exclusively with a presentation of human ills caused by material forces such as bacteria, neoplasms, trauma, poisons,—the organic diseases. Hospitals in which you trained were natural repositories for only that type of case. The men who trained you had lived so long in that atmosphere that they were seldom able to visualize a disturbed physiology produced by any means other than material factors. Ingenious methods had been devised to remedy situations brought about by the "organic" causes of abnormal physiologic behavior but no one seemed to know what to do about the occasional "functional" case other than to label it, speak to the patient about "nerves," and perhaps deal out some sedative. Like you, I received such a training and then found a routine born of this habit

*Read before the Northern Minnesota Medical Association, Brainerd, Minnesota, September 11, 1934.

to be inadequate to meet all the symptoms which patients asked me to relieve or eliminate. If humans were merely pieces of machinery and subject only to disturbances of mechanical origin, then we might effectively serve them by training ourselves to be glorified garage mechanics. But the human is more than a piece of machinery and we must possess in addition some qualifications of the engineer and the architect in order to rebuild machines whose parts are true to specifications but whose functional performance is far from the normal.

In its present mood, Science is reluctant to admit the validity of any theory which cannot be subjected to proof in a laboratory. It must therefore concentrate, like the rest of the world, on mechanistic fields, and has so much unfinished work ahead that little time or thought can be given toward bringing up-to-date our knowledge of the intangibles. But since the human is a machine influenced both by tangible and by intangible agencies, the Science of Medicine must resist with all its power the tendency to fall too completely into the materialistic dogmatism which has brought stagnation and imbalance to the thinking of our century. Fortified by the teaching of Pasteur, whose thinking was untrammelled by too much materialistic restriction and was, therefore, productive, I venture to impose upon you a theoretical concept of possible influences, not organic or tangible, which may set in motion disturbances in physiology as severe as any produced through organic disease. If these influences are truly fundamental, the avenue toward therapeutic attack is open and within the capacity of human ingenuity.

Let us think again about this human machine that sometimes falls ill. It is really a blend or a fusion of two distinct components, each division serving a different purpose and directed by an entirely different method of control. It is with these methods of control that we are chiefly concerned. In order to dispose of it, let us first deal with that component which chronologically and embryologically developed last. This half we may call the frame, or chassis, with its steering apparatus and its driver. It does not get its main development until after birth. Growth and improved function come with training as the years go on. Its control or driver is capable of education, and of choosing what course the machine is to take. Motion in this structural half

is chiefly purposive—the result of a mental process of selection based on thought—the outcome of logic or reason. The degree of development of this capacity to reason differs immensely in various individuals. Originally man lived solely by instinct, and many still continue to be ruled completely by their impulses. In emergencies, our reasoning processes move too slowly and are too insecure for us to depend upon; hence most of us revert to instinctive reaction. But most specimens of so-called “civilized” mankind steer their courses, plan actions, and dictate policies for the human machine on some sort of reasoning basis. This method of control by choice or selection let us for the moment call “Will.” It is one of the two compelling forces driving men to action and the chief one which dictates motor activity for the chassis.

The other component part of the total human may be likened to the power plant. It is the more primitive development, reaches maturity sooner, and after birth is not subject to further academic training but may be influenced to change by habitual repetitions or by the necessity for compensatory adaptation. In this division is the fueling and combustion-chamber, the pump and pipes for circulation, air intake and exhaust—those vegetative processes having to do with metabolism, heat, water-balance, gas-exchange and the like. Practically all of these functions are automatic in nature—and this of necessity is so since they must go on whether the owner is awake or asleep, conscious or unconscious. So complete is this divorce in method of control that the thing we call “Will,” no matter how strongly it may wish to do so, has no more influence over the functional rate or efficiency of any organ than the one sitting behind the wheel has over the firing of gasses in the cylinders of his car. Yet, strangely enough, certain of the intangibles in life may have great influence over the motor activity of any of the groups of cells which form the various physiologic units or organs. Fear, anger, hate, jealousy, pride, greed, worry, anxiety, disappointment, self-consciousness, self-pity, despair, and many other such stimuli to emotional centers may have tremendous power for stimulating or inhibiting this automatic machinery. The effect of over-stimulation or inhibition on the physiology is in no wise different from that produced by bacterial irritation, trauma, poison, or any mechanical means. If

pain results, it is just as uncomfortable with either etiology. Whether this reaction to an emotion is brought about by direct action upon smooth muscle, or is secondary to the outpouring of epinephrine, acetylcholine, thyroxin, or some other chemical catalyst, is of no particular moment to us here. The important point to remember is that our machinery is geared directly to our emotions, and that some degree of emotional by-play goes on throughout most of our conscious life. It is worse than futile—it is asinine—to treat with vaccines, or surgery, or any other mechanical ritual, a bloody diarrhea with abdominal cramps caused through the unhappiness inflicted by a jealous husband. One must be more than a garage mechanic to understand human machinery. It must be recognized that attitudes as well as cancer may produce weight loss, and that in either case there may be a cloudy sinus by x-ray, or even an abscessed tooth, which has nothing to do with the picture. Patients may have inherited a volatile emotional equipment, or they may have trained it by long practice to be "hair-trigger," or they may merely have failed to appreciate that they were making no effort to check a tendency to frequent emotionalization until the habit has been thoroughly acquired. That such trends can be altered for better or worse is evident on every side of us if we will but observe.

People consult doctors because one of two symptoms occur: either they have pain or they have fatigue. The fatigue may involve the whole constitution; or it may be the exhaustion of a single organ like the heart. Evaluation of the causes of fatigue, therefore, are almost as important diagnostically as evaluation of the causes of pain. Both pain, and local or total fatigue, may be the end-result either of physical and material factors or of intangible and non-material influences. Obviously, if fatigue is the complaint which prompts the patient to ask for help, any attempt to treat a fatigue produced by non-material influences with a therapy designed to remedy fatigue brought about by physical factors cannot achieve great success.

Constitutional fatigue is often a prominent symptom (and sometimes the first or the chief symptom) presenting in Addison's disease, anemia, myxedema, coronary insufficiency, renal insufficiency, chronic sepsis, wasting diseases, focal infection, auto-intoxication and several other

morbid states. The intent of this paper, however, is to offer a concept of the origin of functional causes for fatigue. One must somehow explain, in terms of disturbed physiology, the alterations which have produced pain or fatigue even though these symptoms did not originate in material factors. No better explanation suggests itself for such "functional" disabilities than that of overstimulation of organic structures in this second division of the human machine. Either the afflicted individual is, by heritage or by training, unduly receptive to ordinary stimuli or he is forced to face an unusual amount of extraordinary stimuli. Since he cannot exercise selective control by Will over this part of his machinery, stimulation may become automatic and continuous to all groups of cells and he does not know how to shut off the current. It is on this basis that an ultimate decompensation of some overstimulated part occurs. We call it a "functional" ailment.

When, in a heart which has acquired certain disadvantages like incompetent valves, the well-known laws of physics and hydrostatics are violated, the resulting penalty is called decompensation. Because we know the law which was violated, we can back-track and teach the decompensated individual how to put things right and how to live in accordance with the law. It is my conviction that similar laws of conduct, of attitude, and of behavior are in existence and operative; that they may be searched for, found, and postulated; that each time they are violated, especially by someone with pre-existing damage to his emotional-autonomic system, the resulting penalty will be decompensation either in the form of pain, exhaustion of function in some local organ, or constitutional fatigue; that the proper therapy can come only through: (1) the establishment of such laws of conduct and then (2) by instruction of the patient in the art of living in conformity with such law.

Constitutional fatigue has become almost an epidemic in these times. Much of it is on a functional basis but this in no wise diminishes its disabling potentialities. It is extremely important to recognize it because, if permitted to continue to the severer grades of decompensation, it requires about two years of very sheltered existence and carefully managed life to bring the individual back to earning power again. Furthermore, in the early stages of decompensation, it is

possible to use education and reason to show the patient how to turn himself about, but in the severer cases, powers of adaptation are completely exhausted and the patient is absolutely unable to lift himself by his own boot-straps. To know what physiologic alteration occurs in this type of fatigue would possibly be helpful, and a great many theories could be postulated. All I may contribute here is the fact that such cases are common and the effort to show upon what basis they may develop.

Point 1.—You will easily tire if you force yourself to perform some task which you heartily dislike whereas you can put forth five times as much energy in the performance of something for which you have great enthusiasm without more than a transitory fatigue—like golf, or hunting trips. I am indebted to Capt. Hadfield of the English Army for the explanation. He has attempted to explore the secret which governs the occasional superhuman powers coming to one man and the tremendous exhaustion which may disable others. He concludes that we are motivated by the two forces already mentioned,—by impulse and by the thing we called Will. Man gets his superhuman strength when his instinct or impulse (which is usually the stronger force) violently urges some policy and his Will gives complete and unqualified approval. Conversely, he may experience complete and utter fatigue when impulse strongly dictates a policy and Will violently disapproves. So with the "shell-shocked" in the War. Impulse dictated self-preservation; Will demanded exercise of duty and acceptance of danger. The result may be complete exhaustion lasting over a period of years. Impulse and Will were in complete accord over your golf course game but at variance when your wife asked you to beat the carpet. Hence your variable response to the energy output.

Point 2.—All of your life you have been educated to put an emphasis upon results. There is no quicker way to a downfall, especially if you are conscientious and the results will not come about as you would like. Consider what would happen if you approached each patient with mind focused upon the possible results of your action or lack of action. You would certainly develop your coronary occlusion before your fifty-eighth year, unless you were forced sooner to retire from practice as did one young medico

whom I interviewed recently. Violation of this law explains the vomiting by a bright Senior student which has twice prevented him from passing his surgery examination. Learn to accept every obligation and responsibility in the same mood as you pick up a cross-word puzzle; give your best effort and let the result happen. If you give your best, it will automatically produce the best result of which you are capable. But keep your focus on the performance.

Point 3.—Learn and teach how to work fast, or long, without getting mentally in a hurry. Again, keep your focus on the piece of wood under the saw and not on the last piece in the pile. Learn to keep mentally relaxed every minute when there is no need for tension. Remember the heart works twenty-four hours a day and gets sufficient rest by an accumulation of brief diastoles, each one of which is a very small fraction of a second; but during that diastole, the heart will not permit itself to be stimulated.

Point 4.—Learn and teach adaptation to and acceptance of an adverse fact. If it is not to your liking but is surely a fact, you cannot alter it. Therefore accept it, make your readjustments, and change your emphasis concerning it. To butt your head against a stonewall which cannot be climbed, tunneled, or circumambulated, or to permit your patients to do so, is the height of unintelligence. Many a weary soul today got that way because he thought he needed \$5,000.00 per year and could only find \$3,000.00. How do the poor devils on \$2,000.00 get along?

Point 5.—The most basic law of all and most often violated. Five hundred years ago in the physical (material) world, the peoples of this planet began no longer to believe that their globe was a center around which all other planets revolved. During these last five centuries, most of the population have come to believe that ours is just one more planetary body traveling in its orbit. Although for nearly 2,000 years the Christian, and probably many another religion has taught the contrary, we as nations and as individuals go blithely on, firmly convinced that our individual or national entities each must be the center around which all of the rest of the world revolves. This fallacy produces 90 per cent of the disagreeable emotional upheavals of mankind, and still we cling to it. Remember that your most joyous experiences have come to you at a time when your attention was riveted

on some consuming interest, on some goal for which you were striving, on anything but your own relative position in Life. If the jealous husband had been more concerned with his wife's pleasure when she seemed to be enjoying that dance than he was with his own relative position in the threesome, he would certainly have given her less unhappiness and himself less paroxysmal tachycardia and peptic ulcer. And had she felt less sorry for herself over the injustice of the thing but more concerned for his peculiar predicament, she would have saved herself an appendectomy, much instrumentation of the bowel, and six months of bedridden days and sleepless nights. The football player, surrendered completely to his game, is unaware of the pain from a broken rib until after the contest when he has opportunity to think about himself again. Yet Medical Science is content to use salicylates, amidopyrine, or morphine for alleviation of pain and to disregard investigation of the basic principles of another natural remedy which stares us in the face. Again a routine born of habit.

Finally, if you are interested at all in this matter of fatigue, you can make some experimental observations upon yourself. As a group, you have been given by your education possession of superior knowledge concerning the laws of the universe. Your training teaches you logical processes of thought and avoidance of the fallacious reasoning produced by human desire, bias, and prejudice. The very nature of your work requires consecration to a life of service, so that it becomes habitual for you to submerge self in behalf of others. Egocentric attitudes are difficult to generate with such training.

Some day when you are weary beyond description, following a series of sleepless nights and hard days, with a fatigue headache beginning to appear, watch carefully what happens to that fatigue (and even to the headache) when called out on some real emergency. The conflict between the desire to loaf and the Will to be of service is settled when the Will gives the impulse a sound mental spanking and brings it into complete accord with the action. The focus is turned away from self and directed intensely on someone in great need. When all is over, you may find the fatigue and headache gone. To continue the experiment, sit then in meditation over the many injustices done you; permit your professional brother to hurt your pride; or develop a petty jealousy about his apparent success. Having allowed this concoction to stew for a time, tackle a series of charity patients and watch your fatigue mount. When you have reached a point where you are no longer civil to your family, when you resent each new intrusion upon your rest or play, when you must force by Will against your impulse to abandon the office, then take yourself off on a vacation. There you will burn up three times as many footpounds of energy per day as you did at home but with this difference,—the Will dictates it as reasonable and the impulse is in complete accord. In this manner you will again eliminate fatigue. At the conclusion of your experiment, sit in reflection concerning all of the evidence, and perhaps a new meaning will be shed upon some of the things I have just tried to say.

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CUTIS VERTICIS GYRATA FORMATION*

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CUTIS verticis gyrata is the name of a condition of the scalp wherein the topography resembles that of the cerebrum because of the formation of convolutions and furrows. It is a descriptive term which in no way indicates the cause or the underlying pathologic changes in these peculiar formations. I have had the opportunity to observe two patients during the past year who strikingly demonstrate the fact that a final diagnosis must not be made from inspection alone. Although a diagnosis of cutis verticis gyrata might have been made on each of these cases, further investigation was necessary in order to outline the treatment and to make a prognosis. In the one case a malignant condition was discovered, while in the other only a banal inflammation with a favorable prognosis was found.

In order to understand better the anatomic basis for cutis verticis gyrata formation, I shall review here briefly the anatomy of the scalp. The skin, superficial fascia, and the occipitofrontalis muscle with its aponeurosis form the scalp. It is attached to the underlying pericranium by loose connective tissue called the subaponeurotic layer. The skin of the scalp is the thickest in the body except that on the heel, but the scalp is ever so much more pliable. The thickness increases from the front to the back. The superficial fascia consists of a network of connective tissue fibres which run from the skin above to the aponeurosis of the occipitofrontalis muscle below. The connective tissue bands of the superficial fascia bind the skin so firmly to the aponeurosis beneath that when the skin is moved the aponeurosis is carried with it. Contraction of the occipitofrontalis muscle causes the skin of the forehead to wrinkle transversely and the scalp to move forward and backward in some instances. The scalp muscles in humans are rudimentary and are not as well developed as in mammals.

When tumor cells, nevus cells, or infiltrates are found in the first or second layers of the

scalp, they usually appear between the bands of connective tissue. It is easier for the invading cells to displace the fatty tissue and loose structures between the strong connective tissue bands than to displace the bands themselves. This results in folds and gyri, or cutis verticis gyrata formation. The folds are usually in the same direction in certain parts of the scalp. Over the parietal and frontal area this course is antero-posteriorly, while over the occiput and neck they run laterally. The folds are in the direction of the "Langer lines," which in turn are dependent on the direction of pull of the scalp muscles.

Those cases due to tissue hypertrophies Stratton²⁰ explained on the basis that certain types of tissue tend to grow faster than others. He stated that the tissue of the epidermis and corium, for instance, might stretch to a greater degree under certain conditions than would the dense fibrous connective tissue bands; this would cause the scalp to lie in folds. If the bands of fibrous tissue connecting the skin and fascia are destroyed by infiltrating cells, the furrows and holds are lost.

There has been much discussion in the literature as to what constitutes the "true" and "false" types of cutis verticis gyrata and authors have made various classifications on this basis. There are many pathologic processes which may appear as cutis verticis gyrata at some point in their course, therefore it seems more appropriate to me to make a list of diseases which may have this physical characteristic than to divide them into groups of "true" and "false." For, in my opinion, cutis verticis gyrata is a descriptive term and, if present, cannot be false just because the basis is pathologic rather than anatomic.

Cutis verticis gyrata formation has been found in the following:

1. Developmental anomalies
2. Connective tissue hyperplasia
3. Nevi
4. Tumors
5. Inflammations
6. Endocrine disturbances

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7. Following trauma

8. Association with constitutional disease

Having reviewed the written works on the subject of cutis verticis gyrata, I am only citing some of the pertinent literature.

A developmental anomaly of the skin of the scalp was the first diagnostic entity to be called cutis verticis gyrata. Such a case was demonstrated by Jadassohn¹¹ before the Ninth Congress of the German Dermatological Society at Berne. Later Unna²³ described three patients to whose condition he gave the name of cutis verticis gyrata. The cause of cutis verticis gyrata formation in cases such as those ascribed to development anomalies is due to a superfluity of integument which becomes pushed together into fold formations. Fischer⁵ likened the condition unto the fold formations in the scalps of lions, tigers, pumas, and bulldogs. In animals the fold formation can be produced or increased voluntarily by the action of the scalp muscles. However, man has lost the power to wrinkle the scalp along with the reduction in size of muscles of the scalp. The anomaly as it appears sometimes in man is very likely an atavistic phenomenon, a throw-back to that period in evolution when humans could voluntarily wrinkle or fold the scalp. In this condition the skin is normal grossly and microscopically and is as thick in the furrows as in the folds. Belonging to this group of developmental anomalies is the type of cutis verticis gyrata seen in mental defectives of the microcephalic type. The disparity in development, where the skin develops in the usual way while the growth of the brain and skull is retarded, causes this superfluity and the resulting fold formation. Cutis verticis gyrata is a racial characteristic of some primitive African tribes. The members definitely inherit this peculiar fold formation of the scalp and forehead.

Fischer demonstrated a case which he thought to be due to congenital connective tissue hypertrophy. Alderson¹ reported a similar case, but was of the opinion that the tumor might have been neuro-fibromata.

Nevi have caused fold formation. This has been demonstrated by Jadassohn, Unna, Oliver,¹⁶ Fischer, Jordan,¹² Lenormant,¹³ and others. The nevi may be the ordinary pigmented or non-

pigmented moles, neurofibromas (Fischer), neurinomas (Jordan, Masson¹⁴), or fibromas.

Jordan thought that the cases of nevi cited showed juxtaposition of three tumor or tissue types in the following forms: (1) multiple tumors in one case of different kinds; (2) individual types appearing in different patients as tumors of the same location and appearance; (3) tissue of different types appearing in the same tumors. The three types are nevi, neurinomas and fibromas. He thought that both neuromas and fibromas are derived from nerve sheaths and often associated with von Recklinghausen's disease. Jordan agreed with Masson that, aside from leukemic tumors, probably all tumors appearing in form of cutis verticis gyrata are related to the nerve sheaths.

Many banal inflammations can cause cutis verticis gyrata. There has been no explanation offered to show why a very small percentage of common eruptions cause fold formation in certain scalps. The type of inflammation, the degree of involvement, and the duration of the disease seem to play a minor role in comparison to the individual's predisposition to cutis verticis gyrata formation.

The literature contains cases said to be caused by eczema (von Veress,²⁴ Pospelow¹⁸), impetigo (von Veress), psoriasis (von Veress), frequent furuncles (Audry³), chronic folliculitis and perifolliculitis (Hudelo and Richon¹⁰), pemphigus in cases where bullae on the scalp became pustular (Truffi²²), acute inflammation of the scalp (Stratton), and chronic inflammation of the scalp (Parkes-Weber²⁵).

Several cases have been listed where the scalp was the site of some inflammation several years before the appearance of cutis verticis gyrata. Boygrow⁴ described a case in which erysipelas occurred two years before fold formation. Whether the previous inflammations had anything to do with the cutis verticis gyrata formation is very doubtful, but if such a relationship existed, it would be too remote for definite proof.

Diseases of the endocrine glands, particularly those which lead to increase of tissue and general skin changes, occasionally show cutis verticis gyrata sometime during their course. This is especially true of acromegaly, myxedema and cretinism. Gronberg⁹ cited ten cases which oc-

curred in acromegals, and similar examples were seen by Foerster⁶ and Renander.¹⁹ Jordan stated cutis verticis gyrata occurred in myxedema and gave illustrations in support.

Cases of cutis verticis gyrata following trauma to the scalp have been reported by Glaubersohn and Iwanoff,⁸ Stühmer,²¹ and Galant.⁷ Alderson² reported a patient of his who was struck on the head with a piece of wood. An infected wound resulted, which healed in two weeks. However, cutis verticis gyrata soon appeared and the formation has persisted for fifteen years.

Constitutional disease, as we know the term, is not an important factor in cutis verticis gyrata formation. Wise²⁰ and others have associated cutis verticis gyrata with syphilis. In some of the recorded cases no definite relationship between the two conditions could be proved because the fold formation was found accidentally and the syphilis was of undetermined duration. The fold formation did not improve under anti-syphilitic treatment. Leukemic tumors have been seen to take on cutis verticis gyrata formation by Pelagatti¹⁷ and others.

Fischer cited a series of eighteen cases of fold and gyri formation which were studied microscopically. Four showed normal skin, five showed characteristics of the primary inflammation, two showed hypertrophic connective tissue change, six showed nevi, and one showed changes such as seen in acromegaly. Merenlender¹⁵ recorded twenty-two cases studied histologically with the following results: five had normal scalps, seven had inflammatory changes, four had hypertrophic changes exclusively in the connective tissue without inflammation, and seven had nevi of the scalp. The two series seem to correspond with the average percentage of each type found in the literature.

Jordan stated that in his case besides endo-theliomatous tissue in the sense of dura tumors, there are discs and bands which remind him of neurinoma tissue. Many discs and bands resemble "touch corpuscles" which, according to more recent opinion, originate from Schwann cells. In this juxtaposition of nevus cells and of neurinomatous tissue and in the close relations of these to one another, the tumor corresponds largely to the neuro-nevi of Masson. In the fold formation obviously the same type of growth appears which is found in the plexiform

neuroma. In the case cited by Jordan there was enlargement of the sella turcica such as was observed in neurofibromatosis, without disease of the brain or pituitary gland.

Not all tumors of the scalp form cutis verticis gyrata. Of those which do not, many have characteristics in common. Usually they do not spread by continuity but arise from distinct and widely separated locations on the scalp; this is especially true of multiple basal cell epitheliomas of the scalp, or the so-called turban tumors. Often tumors not resulting in cutis verticis gyrata are single and grow equally in all outward directions; this is particularly true of the cysts of the scalp such as cerebral hernias, hernias of the meninges, angiomas, dermoids, atheromas, hemorrhagic cysts of sinuses (sinus pericranii) and traumatic cephalohydroceles. When the growths are multiple, they are often of a high degree of malignancy, and the patients may die before the tumors become confluent or form folds. Metastatic thyroid malignancies and hypernephromas illustrate this group. Others degenerate and change their form so much that fold formation is impossible. Gummas liquefy and ulcerate before folds are formed. Tumors of tuberculous origin, such as scrofuloderma, necrose and form sinus tracts early in their development. Some arise from bone or are closely associated with bone, and the scalp involvement is often secondary; osteomas and gummas are examples of this type. Each of these groups of scalp tumors not usually occurring in the form of cutis verticis gyrata illustrates one or more important points which are unfavorable for fold formation, namely, origin from distinct and widely separated locations, uniformity of growth, cystic formation, very rapid growth, early ulceration or degeneration, and bony origin.

From a study of the reported cases it is at once evident that no one etiological factor is pre-eminently prominent. The following two cases illustrate strikingly the wide variation in the possibilities of cause.

Case 1.—Melanoma of the scalp with malignant degeneration illustrating cutis verticis gyrata formation in a nevus.

G. J., a white boy six years of age, was admitted to the Gillette State Crippled Children's Hospital on December 21, 1933, because of a growth on the scalp. The tumor consisted of three folds and two gyri with

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a nubbin projecting anteriorly from the most lateral fold. The tumor was painless and could be moved freely over the skull with the rest of the scalp. The lesion covered most of the right anterior quarter of the scalp and extended down onto the forehead and

There was a painless submaxillary and subauricular lymphadenitis on the right side. This first appeared when the child was two years old and increased slowly. Growth was more rapid during the last half of 1933. The mass of glands was about the



Fig. 1, Case 1. Melanoma of the scalp with malignant degeneration illustrating cutis verticis gyrata formation in a nevus.



Fig. 2, Case 2. Fold formation on the face accompanying cutis verticis gyrata of the scalp in a case of chronic sensitization dermatitis.

slightly over the midline to the left. The growth stopped abruptly. The folds were approximately an inch thick, of which the central fold was the largest. The nubbin was about the size of a large walnut. The color was not uniform; the posterior and lateral portions were a glistening white, while the mid-portion had a blue tinge; the anterior part was bluish-red. The projection was an angry, deep, violaceous color. The lesion was entirely free from hair and it had the consistency of hard rubber. The nubbin was slightly softer than the rest of the tumor.

The patient's father stated that the lesion was present at birth. It was perfectly flat at birth and covered about the same surface that it did when the patient was first seen. The tumor grew very slowly in thickness until two years ago. The patient was kicked in the head at that time, and after the injury, growth was more rapid, especially in the anterior portion. The fold and gyri formation appeared during the first two years of life and gradually became more pronounced. The nubbin extending from the most lateral fold grew very rapidly during the last six months of 1933. The tumor was black at birth, but it gradually lost color until about January, 1933. Then the bluish-red tinge appeared and became steadily more pronounced.

size of half an orange, and discrete glands from the size of a bean to an olive could be palpated. They were soft to the touch. There was no change in the color, texture, or temperature of the overlying skin. The rest of the physical examination was essentially negative. The family history was of no importance.

The blood Wassermann reaction was negative. Roentgen ray pictures of the skull showed no bone disease. The blood picture was within normal limits at all times.

The nubbin and two submaxillary glands were removed on March 3, 1934, by Dr. C. C. Chatterton. The glands were soft and friable. The entire tumor was removed on April 10, 1934. There were no adhesions to the pericranium, and the tumor shelled off the skull very easily. The wound remained clean, and skin grafts were done May 8, 1934, and by May 24, 1934, the lymphadenitis had disappeared. The patient now feels well and is gaining weight and strength. He weighed 41 pounds in December, 1933, and 48 pounds on May 21, 1934. This seems to be more than the average gain in weight for a healthy child.

Histopathology. The entire tumor was excised and fixed in 10 per cent formalin. Sections were made from different portions of the tumor. They were

stained with hematoxylin and eosin and by the Weigert, Van Gieson, and Laidlaw methods.

The epidermis was very thin in all portions of the tumor. It consisted of three to five layers of cells arranged in a straight line in the malignant portion. The rete pegs were partially abolished or flattened out in the benign portion.

The corium of the benign portion was made up roughly of three parts. The upper third was composed almost exclusively of connective tissue bundles. The connective tissue was arranged in whorls and strands and became denser as the subcutaneous tissue was approached. The middle third was made up of numerous dilated blood vessels scattered among the connective tissue bundles. The lower third consisted of nests of melanoma cells dispersed throughout the dense connective tissue. There was a gradual replacement of connective tissue by melanoma cells arranged in nests and strands as the malignant portion was approached. In the tip of the nubbins the melanoma cells had displaced about two-thirds of the connective tissue.

The small amount of melanin present was in the cells of the malignant portion. The cells themselves showed irregularity in the size of the nucleus and cell, vacuolation and lobulation of the nuclei, and occasional dumb-bell shaped nuclei suggesting amitotic division. Microscopic sections were submitted to Dr. S. W. Becker of the University of Chicago because of his interest in this type of tumor. His diagnosis agreed with the above description.

The elastic fibers were normal, but reduced in number. Sweat glands, sebaceous glands, and hair were totally absent in all portions of the tumor. There was no evidence of nerve tissue in any of the sections. The submaxillary lymph glands showed only banal inflammatory changes.

Case 2.—Chronic sensitization dermatitis illustrating fold formation on the face and cutis verticis gyrata formation in the scalp due to chronic inflammatory changes.

Mr. P. J., aged 71, a farmer born in Sweden, was referred to Dr. Michelson's clinic in 1925 because of a generalized eruption. He said that the eruption began on his forehead in the summer of 1923. This soon involved the face, hands, and arms, and in about six weeks the entire skin was affected.

The eruption began as an erythema accompanied by edema, burning, and itching. This soon became vesicular, weeping, and crusted. After a time the eruption would quiet down and appear as dry scaling on an erythematous base. The severe pruritus remained at all times, but in the summer when he was out in the dust, sun, and wind, it became worse.

When the patient was seen in 1925, the eruption was confined to the face, scalp, neck, and hands. A diagnosis of leprosy was considered because of the peculiar leonine facies. The skin of the face, neck, and scalp appeared in deep fissures and folds. The skin was very thick, dry, dully erythematous, and covered with

excoriations and a dry, fine scale. The eyelids were so thick and edematous that the patient's eyes were barely visible. There was a generalized pea to bean sized lymphadenitis. The patient was next seen in March, 1934. Very little change in the eruption had occurred during his absence of almost ten years. The past history and family history were negative. Examination showed the urine and blood to be normal. The blood Wassermann was negative. No lepra-bacilli were found. Biopsy showed a non-specific chronic dermatitis.

Summary

The anatomy of the scalp is unique in that it favors the formation of folds and gyri because of the nature of its attachments. Therefore any collections, be they inflammatory or tumorous, will change the topography of the scalp, often resulting in a formation which has been known as cutis verticis gyrata. It is my contention that this may be a deceptive descriptive term, because the first cases described under this name were on a purely anatomical basis while later the same term was used to describe this formation due to pathological accumulations. If, then, the term is retained without due consideration of the underlying cause, many errors in treatment and prognosis are bound to be made. The external appearance produced in my cases, one being the result of inflammation and the other the result of tumor formation, might both have been diagnosed cutis verticis gyrata, but the causes were entirely different.

In conclusion, I would urge that this term be used for its descriptive value and that in every case a histological study is imperative for a proper evaluation and for a correct final diagnosis.

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THE MILWAUKEE CONVALESCENT SERUM CENTER

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CONVALESCENT serum has been known to be of value in the prevention and treatment of various infectious diseases since the latter part of the last century. It was not until after August von Wassermann, in 1906, developed a reliable hemolytic test for syphilis that the danger of transferring this disease was eliminated. Since then, human serum has been used abundantly when available.

A serious handicap has been the difficulty in procuring an adequate supply prepared in a satisfactory manner. Authorized serum depots able to prepare and store large amounts of serum have not been developed in this country until recent years. One in Detroit under the City Health Department has been in existence for a period of ten years. Another in Chicago located at the Michael Reese Hospital has been in operation during the past four years.

The motive for the establishment of a human convalescent serum center in Milwaukee was the result of the successful treatment of a serious case of scarlet fever

with convalescent serum. A child in that city was taken seriously ill one evening with the disease. A quantity of serum was rushed from Chicago to Milwaukee by special messenger. After receiving the serum the patient was so improved that the anxiety of the physician and the parents was greatly relieved. The whole aspect of the case had changed within twelve hours. The father of this child was so well pleased with the result of the serum that he wished to do something which would make it available to others. Upon the suggestion of the pediatrician who had cared for his child, he offered to help the serum center which had served him so well. Inasmuch as the Chicago institution was already well financed, Doctor Thalhimier, supervisor of that center, suggested that a serum center be established in Milwaukee. This was done in February of this year. Doctor Koehler and the entire Department of Public Health of Milwaukee cooperated to the utmost in giving this center a successful start.

The purpose of the Milwaukee Serum Center located at Columbia Hospital is to make convalescent serum available to patients who are suffering from various

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infectious diseases. It is a non-profit making organization. Its personnel, when in full operation, consists of a part-time physician, a full-time technician, a diener, and a part-time secretary. The equipment in the new serum center is comparable to that of the Chicago institution. The Milwaukee County Medical Society's Health Council, at a meeting in April, approved the Milwaukee Serum Center as "an ethical, scientific institution, producing various reliable convalescent serums."

There are two sources through which serum is obtained from convalescent patients. A list of recently recovered patients is obtained from the Milwaukee City Health Department. The family physician is called to confirm the diagnosis and to learn if he has any objection to the serum center's asking the patient to sell a small amount of his blood. If the physician confirms the diagnosis, and has no objection, the patient is given an appointment for the withdrawal of blood. Another source of scarlet fever convalescent blood is the South View Municipal Contagious Hospital, from which blood is obtained and where a certain percentage of the final serum is returned.

From the two hundred cubic centimeters of blood withdrawn from adults, approximately ninety cubic centimeters is later available as serum. The blood specimens are centrifuged several times, and the serum is withdrawn aseptically. When sterility and serological tests are found to be negative on the individual bulk specimens, twenty or thirty of these bulks are pooled, thus combining the effective power of sera from various types of cases and also mixing the various blood groups. After the pooling is complete the serum is run through a Berkefeld filter and vialled. When further sterility tests are completed the serum is ready to be dispensed. The various sera are dispensed only through the family physician and may be obtained at any time. The physician in charge of the serum center gladly gives advice as to its use.

In scarlet fever, the blood is obtained from patients after the eighteenth day of the disease until the end of the fourth month of convalescence. The scarlet fever convalescent serum is of value both in the prevention and treatment of the disease. It transfers a passive immunity lasting from ten to fourteen days. Thus, if a contact must remain in the house with a scarlet fever patient, he should receive prophylactic

doses every ten days. The intramuscular route is satisfactory. In the treatment of scarlet fever the serum is of most value when given early, intravenously, and in adequate doses. It usually causes a reduction of the fever, the toxemia, the angina, and the rash. The duration of the illness is also thought to be diminished. Apparently the complications are reduced by one-half when the serum is given early. The usual picture in a severe toxic case is one of rapid improvement within twelve to eighteen hours. If it is given late in the disease, or in a case in which complications have already set in, larger doses are necessary.

In measles the blood is obtained from the end of the second week to the end of the second month of convalescence. In this disease, attempt should be made to prevent measles in exposed children who are undernourished or who are suffering from some other illness. If convalescent measles serum is given to children within five days after exposure it will prevent the onset of measles in the majority of the contacts. If the injection of the serum is delayed until the eighth day of exposure attenuation of the disease will usually occur, resulting in a mild attack which is followed by permanent immunity. This method of attenuation is the one of choice in healthy exposed children.

In mumps the serum has been used much the same as in measles; however, the serum is also thought to be of value in treating the disease and its complications.

Although the value of convalescent poliomyelitis serum is still debatable, some is always kept on hand. If it is to be used in the treatment of infantile paralysis it should be used in the preparalytic stage, and be given both intravenously and intraspinally.

Since this is human serum and not a foreign serum, the question of serum reactions can almost be disregarded. No serious reactions have been observed. Instructions as to the method of giving the serum and preparing the syringes should be closely followed.

The Milwaukee Serum Center has been inspected by Doctor George W. McCoy, Director of the National Institute of Health of the United States Public Health Service and has received a Federal license, which makes it possible for adjoining states to obtain serum from this center. By arrangement with the railway and air express, rapid delivery of serum is possible to any part of Minnesota.

EDITORIAL

MINNESOTA MEDICINE

OFFICIAL JOURNAL OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Published by the Association under the direction of its Editing and Publishing Committee

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BUSINESS MANAGER
J. R. BRUCE, Saint Paul

Volume 18 AUGUST, 1935 Number 8

Convalescent Serum Centers

Anyone who has witnessed the striking effect of massive doses of convalescent serum in the treatment of certain infectious diseases must certainly harbor the desire for a ready reservoir from which to obtain this valuable material.

Although placental extract may replace human serum in the attenuation of measles it is probable that the latter's field of usefulness may extend to include pertussis and parotitis as well as diseases in which specific prophylaxis with animal serum is contraindicated. Its therapeutic use may even be considered in pneumonias of known type.

The successful operation of serum depots in Detroit, Chicago and Milwaukee* should stimulate medical groups to enlarge the facilities now in use for this purpose at local contagious disease hospitals. By so doing they could offer services to the entire profession which are now confined to their institutions.

One might conceive of a "bureau" to be conducted by the local medical society with the co-

*A report of the Serum Center in Milwaukee appears elsewhere in this number of MINNESOTA MEDICINE.

operation of the health department. An agency of this type could operate as a serum center and serve in the registration and certification of professional donors for immunotransfusion.

E. S. P.

Typhoid Increase

Inasmuch as the presence of typhoid fever in any community has come in recent years to be a matter of reproach, the definite increase in the number of reported cases in the Twin Cities and surrounding area is cause for intensive efforts on the part of local and State health authorities to trace the source of the infection.

At the present writing more than 100 cases have been reported in Minneapolis and some fifteen cases in Saint Paul, since the first of May. Several cases have also occurred at Fridley, where Saint Paul taps the Mississippi River for its water supply, and also at Anoka, a few miles above Fridley on the Mississippi.

Investigation by health officers of Minneapolis and Saint Paul and the Department of Preventable Diseases of the State Board of Health so far indicates that all sources of the infection except the water supply can be excluded. It does seem remarkable, however, if the water supply of this area is contaminated, that a frank and widespread epidemic has not occurred.

Of course, the tracing of the source of infection in typhoid is generally very difficult and requires the services of an epidemiologist of unusual detective ability. There is always the danger of contamination of a city's water supply at its source and there is always the possibility of cross connections between private water supply of, for instance, a city office building and the city's supply, although such connections are forbidden by law.

Although during the past fifteen years the incidence of typhoid in the vicinity of the Twin Cities has been so low as to be almost negligible, prior to this period it was not unusual for either of the Twin Cities to have a hundred cases a

year. So the present situation, while a distinct increase over recent years, is not so alarming as it may seem. The increase, however, is sufficient to warrant the energetic measures being taken to decrease the source of the typhoid and to prevent its spread.

A State appropriation of some \$20,000 has just been made to increase personnel and enable more extensive investigation of water and contents. The Minneapolis authorities have increased the chlorine content in the city's supply of water, have closed public drinking fountains and have advised the boiling of water for drinking purposes, in this way endeavoring to make the public water-conscious. Typhoid inoculation is recommended for those who of necessity must travel where typhoid is known to exist.

Doubtless in the near future the puzzling problem will be solved and, the source being discovered, the development of new cases will be prevented.

Demonstrations at the State Meeting

The scientific demonstrations have become a most interesting phase of our annual meetings. This year all the booths afforded interesting material for visitors.

Probably the most interesting exhibit was that presented by the Philadelphia Institute for Medical Research of guinea pigs treated with Hanson's thymus and pineal extracts. The rapid growth and sexual maturity produced in guinea pigs by the injection of thymus extract and the dwarfism and sexual precocity in the third generation following injections of pineal gland extracts constituted an impressive demonstration of a real scientific contribution to a field which is only beginning to be explored. The potentialities of human application plays riot with the imagination.

In the same field of endocrinology was the creditable exhibit of Dr. L. F. Hawkinson of Brainerd, who has a distinct flair for endocrine study. Photographs, charts and guinea pigs, elucidated by the demonstrator, made the entire subject seem perhaps simpler than it is.

The hay fever exhibit by Drs. Ellis, Rosen-dahl and Dahl was beautifully arranged. Specimens of the seeds of various trees, grasses and weeds, and charts showing seasonal pollination

and prevalence offered much material for study. There is still need of simplifying for the general practitioner procedures for testing and treating hay fever sufferers.

The educational value of wax models was demonstrated in several booths. Models of tuberculosis of the mouth and ear were displayed by the Glen Lake Sanatorium staff, and those of cancer by the American Society for the Control of Cancer and the State Cancer Committee. A model in the Mayo Foundation exhibit showed clearly the various conditions which might produce asthma symptoms, and numerous models illustrated various types of diaphragmatic hernia.

Dr. E. K. Green's tularemia exhibit this year was better than ever. Although tularemia is not frequently encountered, the marked increase in recent years in reported cases in Minnesota is cause for some apprehension, even if recognition of the infection accounts for much of the apparent increase. The discovery of infected grouse and animals other than the rodents is not reassuring.

Dr. Nathanson's booth, where he demonstrated the production of cardiac standstill through pressure on the carotid sinus, attracted much attention locally and in scientific periodicals. Dr. Nathanson has been emphasizing for some time the fact that death in heart block is due to ventricular standstill and in most cases of angina pectoris and coronary thrombosis to ventricular fibrillation. The practical conclusions he has come to are that adrenalin is indicated in ventricular standstill due to heart block, while quinidine should be given in angina pectoris or coronary thrombosis in cases showing evidence of ventricular irritability (extrasystoles).

Those interested in medical economics could find interesting material in several booths. The American Medical Association had on display charts showing trends in medical practice. The Minnesota State Board of Medical Examiners had the figures for Minnesota. It was interesting to note that in 1928 there were 162 registered osteopaths and 493 chiropractors, while this year the osteopaths number 160 and chiropractors 414. Since the passage of the Basic Science Bill in 1927 some thirty-three osteopaths have been licensed and only nine chiropractors.

The Parent-Teachers Association booth was busy handing out booklets explaining their Sum-

IN MEMORIAM

mer Roundup activities. It is surprising how many children enter school for the first time with unrecognized handicaps which delay their progress in school. The Summer Roundup movement advocates the child's visit to the family doctor and dentist before starting in school. If this is not financially possible the free clinics are available.

Numerous other demonstrations merit mention, but space forbids. This report would be indeed remiss if no mention were made of the Hobby Show. The display outdid expectations, due to the energy exerted by the committee of which Dr. Fred Olson was chairman. Doctors easily become slaves to their profession and there is no other vocation which needs an avocation more. That so many of our members have such worth while hobbies was quite a revelation.

In Memoriam

Charles Swenson 1876-1935

Born in Orebro, Sweden, October 18, 1876, Charles Swenson came as a child to this country with his parents, who settled on a farm near Rush City. After attending school in Rush City he graduated from Dr. Drew's School of Pharmacy and later, in 1903, received his medical degree from Hamline University.

Dr. Swenson began practice, in 1903, in Braham and the same year built the first Braham hospital, which has actively served the community until two months ago, when it was closed on account of the doctor's recent poor health. Following a mastoid operation in 1926, Dr. Swenson had suffered poor health which, necessarily, compelled him to restrict his activities, and complications which came last winter caused his death, June 22, 1935.

Dr. Swenson was married in 1903 to Zelma Lee of Rush City, who as well as his mother, Mrs. Magnus Lindstrom of Sauk Rapids, survives him. Two sisters, Mrs. A. E. Boppel of Shakopee and Mrs. Fred Boyce of Minneapolis, one brother, Harry Swenson of Saint Paul, and one half-brother, Harold Lindstrom of Sauk Rapids, also survive him.

Dr. Swenson was a member of the American Medical Association, the Minnesota State Medical Association and the East Central Minnesota Medical Society. For eighteen years he served as surgeon for the Great Northern Railway. He also served as director of the First National Bank of Braham, the State Bank of Mora and was president of the State Bank of Ogilvie. At one time he was mayor of the village and its health officer.

AUGUST, 1935

C. E. Gates 1879-1935

Dr. C. E. Gates, Anoka, died June 21, 1935, at the age of fifty-six, following a two weeks' illness.

Chester E. Gates was born in Dover, Minnesota, in 1879. He graduated from the Rochester, Minnesota, high school in 1900 and received his medical degree from the University of Minnesota in 1904. In 1907 he married Miss Inez Harvey, a high school classmate.

Dr. Gates was associated with the State Board of Health for three years following graduation and practiced in Goodhue from 1907 until 1917. He was with the Cobb Clinic, Saint Paul, for a year before locating in Anoka in 1918.

Dr. Gates was a member of the East Central Minnesota Medical Society, the Minnesota State and American Medical Associations. He was an active member of the Methodist Episcopal church, a member of the Kiwanis Club and a Mason. He also belonged to the Alpha Kappa Kappa medical fraternity.

Dr. Gates is survived by his widow, a daughter, Emily, who is a medical student at the University of Minnesota, a brother, Arthur, of San Fernando, California, and three sisters, Mrs. S. S. Tuttle and Miss Ella Gates of San Fernando and Mrs. Earl Bixler of Aberdeen, South Dakota.

Herman M. Johnson 1873-1935

WHEREAS, The great and supreme Ruler of the universe has in his infinite wisdom removed from among us, one of our worthy and esteemed fellow-laborers, Herman Johnson, and

WHEREAS, The long and intimate relation held with him in the faithful discharge of his duties in this Society makes it eminently befitting that we record our appreciation of him,

BE IT RESOLVED, That the wisdom and ability which he has exercised in the aid of our organization by service, contributions, and counsel, will be held in grateful remembrance, and

BE IT RESOLVED, That his sudden and unexpected death leaves a vacancy which can not be filled in the society, his home community or the state, and

BE IT RESOLVED, That with deep sympathy for the bereaved relatives we can but hope that the memory of him which is ours and his spirit which abides will carry us all on to higher and greater accomplishments, and

BE IT FURTHER RESOLVED, That a copy of this resolution be spread upon the records of this organization, and a copy forwarded to the bereaved family.

(Signed) W. L. BURNAP
J. M. HAYES
L. L. SOGGE

The above resolution was passed by the House of Delegates at its June session. A similar resolution in appreciation of the time and effort expended by Dr. Johnson in the mutual interest of the public and medical profession was drawn up by the Executive Committee of the Ramsey County Medical Society on June 20.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the

Minnesota State Medical Association

B. J. Branton, M. D.
J. A. Moga, M. D.

W. F. Braasch, M. D., Chairman

J. C. Michael, M. D.
A. N. Collins, M. D.

Passed by the House of Delegates

Deliberations of the House of Delegates will be outlined in full in a later issue of MINNESOTA MEDICINE.

The following high lights are of especial interest and importance, however, and merit more than routine attention.

Membership Cooperating

From the report of Dr. E. A. Meyerding, secretary of the Association:

"The mid-point of the year 1935 finds the State Association in excellent condition from the standpoint of organization.

"The membership has increased substantially over last year at this time and the affairs of the Association and its component units over the entire state are proceeding with a marked absence even of minor difficulties and differences.

"The entire membership may be congratulated, I believe, for the soldierly manner in which it has carried on its work this year, loyally defending its high standards and maintaining its ethics in these times of unrest."

Reaching the Teacher

From the Report of the Committee on Public Health Education, Dr. L. R. Critchfield, chairman:

"The year 1935 has witnessed a departure in public health education in Minnesota.

"It has seen the establishment, after many years of planning and investigation, of a medical lecture course for teachers' colleges and training schools.

"This lecture course, which was carried on with the coöperation of the Minnesota Public Health Association, was inaugurated this year in five State Teachers' Colleges.

"A series of four and five lectures was given at each of these colleges and the interest and enthusiasm with which they were received is re-

flected in the unsolicited praise of superintendents and school officials.

"The importance of reaching the future teachers and educational executives of Minnesota with legitimate and authentic information in matters of health and disease prevention must be obvious to every physician.

"It has taken considerable preparation and much preliminary organization work among the colleges to inaugurate this course and the project is still in its infancy.

"A questionnaire sent to the heads of the five teachers' colleges shows beyond any doubt that these officials regard the first series as a valuable addition to their program and that they are hoping for an amplified course next year.

"A foundation is now being laid, we feel, for an important new field of study for student teachers, a study that is long overdue; in fact, we feel that every effort should be made by this committee to continue the work."

Health Education

"Assuredly, the importance of public health education to the practicing physician grows with each shift in our changing social order.

"An intelligent, well informed public will choose a family physician and apply to him for every accepted protective measure known to medical science. It will apply to a physician for the essential individual physical check up so as to discover disease in its incipency and thus save itself both money and suffering. Furthermore, an intelligent, well informed public will want that physician to be its own private physician in preference to any conceivable medical service that may be made available through compulsory, tax contributory health insurance.

"The chief problem before medicine today is not the re-organization of medical services as they are now functioning in America. It is surely the education of the public to the proper and complete use of the services already available.

"The regular services carried on year after year by this committee are designed toward that

end. They should form an important and necessary link between the medical man and the public, never more important than now when dissatisfaction with the fact that there is unnecessary and unattended illness in the world is prompting many misguided reformers to exchange a workable system of medical care in America for European systems that have not succeeded in cutting down unnecessary illness elsewhere in the world."

On the Air

From the Report of the Radio Committee, Dr. S. R. Maxeiner, Minneapolis, Chairman:

"Our program (Tuesday mornings over WCCO, Dr. William A. O'Brien, Associate Professor of Pathology and Preventive Medicine, University of Minnesota, speaker) is still rated as one of the most popular and best known of all features from Station WCCO. The mail continues very heavy but an attempt is made to answer each letter promptly.

"There has been an unusual demand for personal appearances by our speaker, Dr. O'Brien. He has been unable to fill a good many of these engagements although he accepted approximately 100 during the period from June 15, 1934, to June 1, 1935.

Radio Reform

"Starting July 1, the Columbia Broadcasting System announces a change in policy.

"Children's program will be edited by a child psychologist and a group of experts. Patent medicine advertising for internal remedies and certain objectionable forms of external remedies will no longer be sponsored by the Chain or by locally owned Chain Stations.

"This means that cathartics and laxatives are 'off' the air with one exception in which a longer contract is involved. The amount of advertising in all programs is to be limited. We feel sure our program will be helped by this change in policy."

Medical Narratives

From the Report of the Historical Committee, Dr. John M. Armstrong, St. Paul, chairman:

"Your Historical Committee has now in form ready for the printer the following manuscripts:

1. History of Minnesota State Medical Association—Dr. Hamilton.

"The Narrative of Medicine in the following counties with biographies:

2. Ramsey—Dr. Armstrong.
3. Hennepin—Drs. Hamilton and Hansen.

4. Washington and Chisago—Compiled.
5. Goodhue—Compiled.
6. Winona—Compiled.
7. Scott—Compiled.
8. Blue Earth—Compiled.
9. Wabasha—Compiled.
10. Dakota—Compiled.
11. Freeborn—Compiled.
12. Nicollet—Compiled.
13. Carver—Compiled.
14. Brown—Compiled.

"It will be noted that these histories cover the counties bordering on the Mississippi, St. Croix and Minnesota Rivers, the oldest counties of the State.

15. Medical Legislation in Minnesota—Dr. Armstrong.
16. Medical Journalism in Minnesota—Dr. Armstrong.
17. Medical Instruction in Minnesota—Dr. Armstrong.
18. Medicine Previous to the Settlement of Minnesota—Drs. Hamilton and Armstrong.
19. History of the Southern Minnesota Medical Society—Dr. Hansen.
20. History of the Minnesota Academy of Medicine—Dr. Hamilton.
21. Edward Purcell, The First Physician in Minnesota—Dr. Armstrong.
22. The Asiatic Cholera in St. Paul—Dr. Armstrong.
23. Biography of Dr. Thomas S. Williamson—Dr. Hamilton.

"The following manuscripts have been collected by the Committee:

24. Diseases of the Dakota Indians—Dr. Thomas S. Williamson.
25. Dakota Medicine—Dr. Thomas S. Williamson.
26. History of the State Board of Health—Dr. Everett C. Hartley.
27. First Period of the Practice of Medicine in Minnesota—Dr. Fairchild.
28. Practice of Medicine in the Northwest—Dr. Walling.
29. Medicine in the St. Croix Valley—Dr. T. C. Clark.
30. Biography of Dr. Thomas S. Williamson—Dr. Hamilton.

"The following have been promised the Committee to be ready by the time of the Annual Meeting in June:

31. History of the State Hospitals—Mrs. B. L. LaDu.
32. History of Medicine in St. Louis County—Dr. Bardon.
33. History of Medicine in Olmsted County and the Mayo Clinic—Dr. Braasch.
34. The Committee also has compiled a list of those admitted to the State Association together with

the date and place of their graduation in medicine. In addition to the above the Committee has a number of other manuscripts and reprints relating to the history of medicine in Minnesota.

"In all the papers mentioned the narrative has been made as comprehensive as possible to the year 1900. Since that date the subject has been of necessity somewhat abbreviated.

"The Committee believes there is more than sufficient material to form a first volume."

Post Graduate Education

From the Report of the Committee on Hospitals and Medical Education, Dr. C. A. McKinlay, University of Minnesota, chairman:

"Post graduate courses before county societies have been used frequently during the past two or three years. Several factors may be involved. One of them may be that the overhead on these courses is burdensome compared to the cost when physicians are invited individually.

"Actually the percentage for overhead is very low, usually seven to ten per cent as computed by the Extension Division of the University, added to actual travelling costs of the lecturers.

"Societies will always exercise the privilege of invitation, of course, with or without attention to the expenses of the lecturer. The value of coördination of faculty and subjects through the Extension Division is apparent, however. This service is available at a very reasonable cost.

"It is also suggested that bulletins on post graduate courses be revised to include names of lecturers as well as subject matter. . . ."

Too Many Medical Students

From the Report of the Committee on University Relations, Dr. F. J. Savage of St. Paul, Chairman:

The following interesting quotations on the problems of limitation of students in medical schools from members of medical school teaching staffs formed the basis of the report:

"The problem involves action on a national scale to be effective. The number we have now is 20 per cent too large for the best teaching."

"Fifty per cent of the present enrollment could receive adequate instruction with present facilities and staff."

"We are graduating too many men, some of whom are obviously unfit to practice medicine."

"... An over-crowded profession means a degenerating profession. This is particularly true of medicine where opportunities of entering into related professions are almost non-existent. The temptations ordinarily not listened to become, for some people, overwhelming

in the presence of adversity. It is not good public policy to educate more doctors than the public requires. This question will doubtless receive faculty consideration in the near future." (Dean R. E. Scammon, University of Minnesota.)

"What is the solution as far as our medical school is concerned?" the Committee asked in conclusion.

"On good authority we make the statement that, from two standpoints—the needs of the state and adequate teaching—80 admissions to the freshman class represents the desirable number. This limitation of students could be accomplished at the University of Minnesota by action of the Board of Regents.

"We, therefore, recommend to the House of Delegates of the Minnesota State Medical Association that the Secretary be instructed to transmit a copy of this report to the Board of Regents of the University of Minnesota with the request to them that they appoint a committee to investigate the statements made in this report and that, if the statements are found to be true, they take prompt action to curtail the ever increasing output of physicians and thereby maintain the standards of the medical profession."

Committee Will be Appointed

The Reference Committee, of which Dr. J. C. Hultkrans of St. Paul was chairman, recommended the adoption of this report in its entirety including its final recommendation.

A committee of the Council accordingly will be appointed to take the matter up with the Board of Regents.

For More Reserve Officers

From the Report of the Committee on Military Affairs, Dr. F. L. Smith, Rochester, chairman:

"In view of the fact that the R.O.T.C. medical units have been discontinued by act of Congress, the only means of maintaining the reserve medical quota lies in the effort of the State Association to contact young physicians who are physically qualified and interest them sufficiently to apply for commission.

"The Corps Area Surgeon states that his office will be sorely taxed to supply the authorized increase of CCC camps in this Corps with reserve officers. . . . In order to maintain the present standards of efficiency of the medical personnel of CCC organizations, the Corps Surgeon prefers to appoint from the Reserve lists as he has first hand knowledge of their qualifications.

"This work which the government is foster-

ing gives an excellent opportunity for the young graduate to become acquainted with routine duties and develop initiative in performing the duties of a medical officer. It also offers a lucrative income for those without funds to help them to establish themselves in the practice of their profession."

Malpractice Suits

From Dr. B. J. Branton, Willmar, member of the Committee on Medical Economics, reporting on a study of malpractice cases made for his committee and the Council:

"1. There has been a marked increase in the number of malpractice cases brought during the last five years and the size of the verdicts obtained against medical men.

"2. Only a small percentage (one per cent) of those brought are justifiable.

"3. Less than 5 per cent of the lawyers in the state will bring such a case against a doctor. But this percentage embraces some of the most aggressive members of the legal profession.

"4. Because of the above conditions, many of the insurance companies issuing physicians' malpractice liability insurance hesitate to assume this coverage and have markedly increased such insurance in the state.

"Therefore we recommend that a committee on legal defense be formed consisting of three members: one to be appointed by the president of the State Association, one to be appointed from the members of the Council, one to be a lawyer, preferably the legal representative of the State Board of Medical Examiners, his appointment to be made by the Council of the State Association. This committee to meet once a month at stated times or at the call of the chairman to discuss each new case brought in the state against a member of the association; to give advice and assistance, if requested, in the conduct of the case."

The Council will study the details of the establishment of a subcommittee of the Medical Economics Committee, following the recommendation of the Reference Committee and the House of Delegates and subject to budget adjustments of the Finance Committee of the Council.

Affiliate Membership

The perennial question of affiliate membership—shall the age limit be extended, lowered or removed?—will be settled once for all if the amendment accepted by the House of Delegates for publication and final action next year is

finally added to the Constitution and By-Laws of the Association.

By this amendment, the age qualification will be entirely removed from the consideration of fitness for affiliate membership.

Following is the amendment as presented to the House.

Proposed Amendment

"Section 4. Affiliate members shall be those members of component medical societies:

1. Who through disabilities are unable to engage in the practice of medicine.
2. Who have retired from the practice of medicine.

Provided, however, that such member, in either class, shall have first, upon his own request, been declared an affiliate member of such component society at its regular meeting, such action having been approved by the Council, and provided, further, that such affiliate membership shall automatically cease and revert to its previous status upon termination of the disability or upon resumption of practice."

It was suggested by the Delegates that a clause be inserted to make it clear that the amendment was not designed to be retroactive and that members already declared affiliate, with approval of the Council, would not lose their present status.

Health Insurance

The delegates went on record once more as standing united behind the House of Delegates of the American Medical Association in its opposition to compulsory contributory health insurance in America.

The resolution in which its attitude is again vigorously stated is printed below. Also a resolution of commendation to some of the major news services of the country for the marked rise that has been noted in the standards of reporting in the field of legitimate medicine.

On Health Insurance

WHEREAS, due to certain irresponsible and unjustified declarations made in the past by members of subsidiary scientific societies, an impression has been created in some quarters that organized medicine as a whole does not support the House of Delegates of the American Med-

ical Association in its stand against compulsory, contributory health insurance, and

WHEREAS, this is the first great state medical meeting to be held following the vigorous restatement of its stand made by the American Medical Association at Atlantic City, and

WHEREAS, the Minnesota State Medical Association and also the great majority of practicing physicians of the United States present a united front, in fact, in its unalterable opposition to any scheme for compulsory health insurance, regarding it as unfair, in America and seriously affecting the progress of medicine and the standards of medical care, BE IT THEREFORE

RESOLVED, that the House of Delegates of the Minnesota State Medical Association go on record again as definitely supporting the House of Delegates and the Board of Trustees of the American Medical Association in its stand against compulsory, contributory health insurance, and be it further

RESOLVED, that it commends the American Medical Association for its enterprise in giving assistance and encouragement to experiments controlled by county and state medical societies in new plans for distribution of medical care for low income classes and the indigent, and be it further

RESOLVED, that it go on record as approving that type of experimentation in Minnesota wherever it seems necessary.

On Reporting

WHEREAS, within the memory of many members of this society, quack remedies and quack practitioners occupied prominent positions in the advertising and news columns of virtually all the newspapers of America and accurate reporting of scientific medicine's advances was almost unknown, and

WHEREAS, within recent years fraudulent advertising of this character has been largely eliminated, no doubt at heavy loss in revenue to the newspapers, and simultaneously a marked rise has been noted in the standards of reporting in the field of legitimate medicine so that today in Minnesota and most generally throughout the country it is obvious that the health of the people and the forward march of medical science has become most important news.

NOW, THEREFORE, BE IT

RESOLVED: That the Minnesota State Medical Society, in House of Delegates assembled, express its sincere commendation of this greatly enlightened attitude of the newspapers and the press services generally, noting with especial approval the accurate and full reporting of medical matters by the science service of the Associated

Press and the Scripps endowed "Science Service."

The Council Meets

Four prolonged sessions marked the deliberations of the Council in the course of the three day annual meeting at Minneapolis and the Sunday preceding.

Much time was consumed in essential discussion of the grave problems before the medical profession of Minnesota today. Action, in most instances, was deferred for further study by special committees of the Council.

For instance:

What definite machinery will be set up to work with Dr. A. J. Chesley and the State Department of Health in the conduct of the public health program contemplated in the Social Security Acts waits final action of Washington and further study by the Council.

How the association will profit by the comprehensive report upon the malpractice litigation situation made for the Council by Dr. B. J. Branton of Willmar will be determined at the fall meeting of the Council.

What is to be the policy and function of the association with regard to the newly announced Works Progress Administration which proposes to eliminate for all employable persons any direct payment of medical bills out of relief funds, also awaits further information from SERA headquarters and further conferences between the physicians and SERA officials.

Legislative Chairman

Dr. L. L. Sogge of Windom was appointed chairman of the Committee on Public Policy and Legislation by President W. A. Coventry to fill out the unexpired term of the late Dr. H. M. Johnson, with the approval of the Council.

At the instance of the Council, Dr. Sogge called the members of his committee together immediately in order that they might be prepared to report in the fall on the future policy of the committee.

New Budget

A new budget for Association expenditures is under contemplation by the Finance Committee of the Council, Dr. H. Z. Giffin, Rochester, chairman, told the Council.

To that end, a thorough study of all the activities of the organization is under way. All new proposals involving major expenditures of funds were therefore referred to this committee for study, and action postponed until the fall meeting of the Council.

History

The work of the Historical Committee on the Association's history in Minnesota is nearly completed.

Dr. John M. Armstrong of St. Paul, who succeeds Dr. A. S. Hamilton, unable to serve as chairman because of illness, officially conveyed this information to the Council.

The committee was empowered by the Council to finish compilation of manuscripts for printing and to submit it to publishers for estimates of costs.

New Society

The new Dakota County Medical Society will receive its charter with seven names of charter members inscribed, by direction of the Council following appropriate action of the House of Delegates.

Thus the thirty-fourth component medical society joins organized medicine in Minnesota.

Committee Discontinued

At the suggestion of Dr. W. F. Braasch, chairman of the Committee on Medical Economics, the sub-committee of that body to study the limitation of the number of physicians to be licensed in Minnesota was discontinued.

The work of this sub-committee has been assumed by the Committee on University Relations, of which Dr. Frank Savage of St. Paul is chairman.

"D.P.H."

The degree, "Doctor of Public Health," is not recognized by law in Minnesota, F. Manley Brist, attorney for the association, told the Council.

Public health officials who lay claim to the degree and the title do not acquire, on that account, any right to practice medicine in any form in the state.

OF GENERAL INTEREST

Dr. B. H. Haynes, formerly of Lewisville, Minnesota, is now located at Blue Earth, where he opened offices, June 15.

* * *

Dr. E. M. Sorenson, formerly of Round Lake, Minnesota, has become associated with the Bratrud Clinic, Thief River Falls, Minnesota.

* * *

Dr. W. M. Youngerman has left Rochester, Minnesota, and has been associated with the Christie Clinic, Champaign, Illinois, since July 1.

* * *

Dr. J. S. Shrader, formerly of Hollandale, Minnesota, has purchased the practice of Dr. H. A. Schneider at Jordan, Minnesota. Dr. Schneider is now located at Owatonna.

* * *

Dr. Robert E. Rock, Saint Paul, for several years with the State Board of Health, was married, June 18, 1935, to Miss Beryl Canfield, Minneapolis. Dr. and Mrs. Rock will make their home in Minneapolis.

* * *

Drs. W. J. and C. H. Mayo were awarded the honorary degree of Doctor of Laws at the commencement exercises of the University of Minnesota, June 17. The diplomas, each bearing the names of both brothers, were inscribed as follows:

"Honored and respected wherever thought is given to Medical Science, recognized as outstanding figures in an era of unparalleled scientific advancement, founders of a great institution for medical research, unceasing advocates in behalf of better education, known to the world and neighbors alike as Brothers William and Charles, inseparable; on them the Regents of the University of Minnesota, on recommendation of the faculties, confer the degree of Doctor of Laws honoris causa with all of the rights and privileges belonging to that degree."

Meningococcus Antitoxin

The Council on Pharmacy and Chemistry reports that a review of recent studies has convinced it that meningococcus antitoxin shows a promise that makes it worthy of more extended clinical trial; the evidence, however, not being sufficient to warrant unlimited acceptance, the Council voted to accept the product submitted by Parke, Davis & Co. for one year only, in the hope that this acceptance may result in a clearer evaluation of its usefulness. At the end of that period the Council will give the product further consideration. (*Jour. A. M. A.*, March 23, 1935, p. 1007.)

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of May 8, 1935

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club, on Wednesday evening, May 8, 1935. The president, Dr. A. R. Hall, called the meeting to order at 8 p. m. There were fifty-eight members present.

Minutes of the April meeting were read and approved.

Upon ballot, Dr. Louis A. Buie, of Rochester, was elected a candidate for associate membership.

Dr. J. F. Corbett read the following memorial to Dr. Arthur T. Mann, and a motion was carried that this be placed in the permanent records of the Academy and a copy sent to Dr. Mann's family.

DR. ARTHUR TEALL MANN was born in New York City in 1866, and died on April 15, 1935. His father, Samuel Rexford Mann, was a man of considerable wealth and it is of interest to know that the father, being free to do what he liked, as an avocation, became an artist and produced some worthy pictures. Dr. Mann's mother, Georgiana Teall Mann, was a woman of strong personality and possessed the ability to develop something worth while in her children, of whom there were four, and, what is more important, to cause them to develop themselves.

An old grey stone house in New York on 24th street, still standing and today furnishing evidence of its pristine attractiveness, was the home where the family was raised until the death of the father. About 1876 the family went to Rochester, New York, and a little later at the solicitation of Judge Teall removed to Eau Claire. On account of the reputation the University of Minnesota had achieved, Mrs. Mann took her family to Minneapolis in the early eighties. Arthur T. Mann entered the University and received his B.S. degree in 1888. He helped organize the first football team at the University and played on the team. He also played baseball and it was said he never muffed a fly in three years. In addition, as a boy, he loved to sail a boat.

After leaving Minnesota he entered Harvard Medical School and was graduated *cum laude* in 1896. He served as an intern at Channing Hospital, Brookline, Mass., from 1895 to 1896. From 1896 to 1898 he was house surgeon at Boston City Hospital and continued his medical training as resident at Massachusetts State Hospital from 1898 to 1899. He took postgraduate work in Boston in 1902 and abroad in 1904. He again visited medical centers of Europe in 1914.

After this long training he returned to Minneapolis to practice his profession and served as Assistant in Surgery at the University of Minnesota Medical School from 1899 to 1902. He was instructor from 1902 to 1906; Clinical Professor to 1913; and, from that date, Associate Professor of Surgery to the present time.

He was Chief of Surgical Service at the Minneapolis

General Hospital from 1913 to 1922. On that date he relinquished active service to go on the Consulting Staff. He also served on the surgical staff of Northwestern Hospital and Abbott Hospital for a long period of time. He was Surgical Consultant in U. S. Public Health Service from 1919 to 1923, when he did an enormous amount of surgical work on the returned soldiers.

In 1918 to 1919 he served as a Major in the Medical Corps of the U. S. Army, and as Chief Surgeon at Camp Dodge, Iowa.

He was a member of the Hennepin County Society, the Minnesota State Medical Association, a Fellow of the A.M.A., Fellow of the Western Surgical Society, Fellow of the American College of Surgeons, a member of the Minnesota Pathological Society, past-president and member of the Minneapolis Surgical Society, and member (since 1903) of the Minnesota Academy of Medicine. His services as Secretary-Treasurer for 16 years and later as President of Western Surgical Society are remembered by a widely distributed group of surgeons. He served as a Governor of the American College of Surgeons.

In 1904 he married Miss Winona Orff, and at the time of his death they resided at 2437 Park Avenue.

He was a member of the Minneapolis Club, the Woodhill Country Club and the Lafayette Club. He was a golf player and especially enjoyed a game of chess. He particularly excelled at chess and during these games the thoroughness and generosity of his character was revealed in a striking manner. He knew the game, but if his opponent started a false move he would caution him to go slowly.

Probably on account of his English ancestry, he was reserved, self-possessed, determined to carry out his always laudable purposes, courageous to follow his logical way of thinking, confident of his conclusions. He hated exploitation and sham, and aimed to see both medical and other conditions as they really were.

He attended the Presbyterian Church and his conscientious performance of all he did is a tribute to his religion.

As a practitioner of his profession, he showed all of the characteristics that have been enumerated in the analysis of his personality. He had been thoroughly grounded in his profession and often from the fundamental facts could develop application to his work that appealed to one who followed his logic based on sound premises.

He was versatile in the range of his work and in a widely spread field showed evidence of thorough grounding and ability to meet new and unsolved problems. His contributions to literature cover many fields of effort. A partial list of these is appended. The rise and development of the Western Surgical Society

PROCEEDINGS MINNESOTA ACADEMY OF MEDICINE

is probably due in a large measure to his efforts for that organization.

The Minnesota Academy of Medicine mourns the loss of Dr. Mann as a member.

His memory endures. The influence of his sturdy reliance, his integrity and honesty of purpose, manifested by intense application to whatever the task might demand, will inspire our members as long as memory endures.

Signed by the Committee:

HARRY P. RITCHIE,
HORACE NEWHART,
J. F. CORBETT, *Chairman.*

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The scientific program was as follows:

LATE RESULTS IN A CASE OF ARTHRO- PLASTY OF BOTH HIP JOINTS FOR PAINFUL ANKYLOSING ARTHRITIS

Dr. Arnold Schwyzer
Saint Paul

Dr. Schwyzer presented the patient whose right hip he had operated on seventeen and one-half years ago and the left hip nineteen and one-half years ago, and gave the following case report:

Mrs. F. C., a farmer's wife, had been an invalid, for many years, due to an almost complete and very painful stiffness of both hips in extension and adduction. The pain had become constant and almost unbearable in the past few months. She was unable to walk and every morning her husband had to carry her downstairs and lay her on a couch that she might somewhat supervise the work of the children in the house. She was, of course, unable to sit on account of the rigidity of the hip joints. In the evening she was carried up again and thus day after day was spent in misery.

The general condition of the rather fleshy but well-built person was reasonably good, though the pain had caused marked lines in her face. She was despondent and readily cried. It was evident that she was, however, not of the complaining kind and that her physical resistance, including her heart, had suffered.

The outer configuration of the hips was not particularly abnormal. The legs were in extension and adduction with outward rotation. The right knee was held crossing the other in front. The left hip was the most painful. There was practically no rotation in this joint, no abduction at all, but apparently a few inches of flexion forward. The right hip joint had a just barely noticeable rotation, about 15 degrees at best. Anterior elevation of the foot from the bed on this side was about 12 inches. Abduction none. This forward motion made it possible for her to take some small steps when well supported. However, this effort was very painful.

The left hip being the most fixed and the most painful, we decided to operate upon this side first, which was done on December 7, 1915. A large flap with base upward was formed over the trochanter and from its middle a vertical straight downward incision enlarged the wound. With a Gigli saw the greater trochanter was divided and with the tendinous insertions was lifted upward. A large amount of ossified tissue in the capsule and along the edges of the acetabulum was removed, the joint was opened freely, and the head trimmed into shape to move freely in the socket. Repeated dislocation and reduction was executed until the hindrances to free motion were well located and removed. Then a portion of the gluteus minimus and medius with some connective tissue was formed into a pedicled flap and turned into the acetabulum after the head had been widely dislocated and the posterior parts of the capsule had been well brought to view for trimming by forced outward rotation of the dislocated femur. The flap overlapped the acetabular edge where the capsule had been cut away and thus insured us against a re-forming of a too-tight capsule. The ileo-femoral ligament was left intact as well as feasible. A sixpenny nail through the trochanter fixed the latter perfectly, and the wound was closed without drainage. The patient left the hospital on January 22, 1916.

Two years later the patient came back to the hospital. She now wanted the other leg operated upon. This was done on December 18, 1917. By December 24 she could spread the legs actively to a distance of 33 inches between the heels and passively to 38 inches. However, we had apparently been too confident with active and

passive motions, and on January 5 (two and one-half weeks after the operation) we had to aspirate a hematoma which had formed. This hematoma is probably the cause of the right hip joint being somewhat less movable than the left one at the present time.

about interposition of tissue is right. McAusland came out and advised the interposition of fascia some years ago. I had a case of very bad complete ankylosis of the elbow where much bone had to be removed, and there I felt it would not do to put any interposition



Fig. 1. Present condition nineteen and one-half years after arthroplasty for ankylosis of left hip.



Fig. 3. Extent of painless abduction at present.



Fig. 2. Present condition seventeen and one-half years after arthroplasty of right hip.

The end-result you can read from the photographs. The patient declares that she had absolutely no pain all these years and is very emphatic about this point. Her walk is poor, and she nearly always uses a cane, but she gets upstairs alone and says she is on her feet all day long. On stepping, she can put one heel 19 inches in front of the other one, and she can spread her legs to a distance of 23 inches between the heels without any pain.

In one of the photographs you notice a varicose ulcer below the inner malleolus on the left foot. This was treated by an Unna gelatine cast. The patient is not walking so very freely, as she has become rather heavy, having gained 40 pounds.

Addendum: The interposition of a live pedunculated flap of muscle tissue (rather than fascia) had undoubtedly its main value in hindering the re-formation of the thick partly ossified lower and posterior portions of the capsule, which were the main cause of the ankylosis. The flap had its base postero-inferiorly and most probably remained muscular at the acetabular rim (at least partly) long after the flap in the acetabulum had undergone pressure atrophy.

Discussion

DR. F. R. WRIGHT (Minneapolis): When a man can show a patient after 20 years who was restored from a bedfast patient to one who can get around on her feet and be a useful citizen, he has really accomplished something.

DR. SCHWYZER (in closing): What Dr. Cole said

at all. We started motion the day after operation and got a very good result with considerable mobility.

THE EVALUATION OF THE TREATMENT OF DUODENAL ULCER

Donald C. Balfour, M.D.
Rochester, Minnesota

Abstract

There probably is no chronic disease which present such great difficulty in measuring the results of treatment as does duodenal ulcer. The reason for this chiefly is that the disease manifests the widest variations, particularly in regard to character, frequency, and length of attacks. In some cases of duodenal ulcer permanent healing takes place without any treatment; in others, simple measures of treatment are required; in still others, intensive management is necessary to control the symptoms and to prevent their recurrence; yet in others, operation is required; and, finally, there are cases in which every known method of treatment fails to prevent recurrence or reactivation.

It is because of the great variability in the course of the disease and in its response to management, that it is not only impossible, but most unfair, to attempt to compare the results of medical and surgical management. Surgical results are based on those cases in which medical treatment has failed because of chronicity, the development of complications, and so forth, so that comparisons are not justifiable. I believe it is

unquestionable that medical management has become more efficient in the past few years. This fact, together with the likelihood that the disease is not as serious as it was formerly, probably explains the smaller percentage of patients who apparently require surgical treatment.

In the majority of cases of duodenal ulcer the symptoms or disability are not sufficient to present any difficulties as to management and the patient should be impressed with the importance of so regulating his habits of living that chronicity of the disease can be avoided. In cases of acute perforation, and in cases of chronic obstruction in which symptoms are severe or persistent, the indications for surgical operation are quite clear.

Those cases in which there may be some doubt as to the proper course to follow may be divided into three groups: (1) young patients whose symptoms are marked and recur frequently, and for whom, because of their age, medical treatment is unsatisfactory; (2) those patients who have relatively short attacks of pain, perhaps a week or two of symptoms occurring only once or twice a year, and complete freedom in the intervals; (3) those patient who have the hemorrhagic type of ulcer. This third group presents the most baffling problems in respect to most efficient management. Surgical management should include measures designed to give maximal protection against recurrence of hemorrhage.

The chief problem concerning hemorrhage is in cases of recurrent bleeding, without pain. As a rule the lesion is small and does not involve the pylorus, which explains the absence of pain. Many such lesions are acute and probably heal rapidly after hemorrhage has occurred. Infection probably plays a prominent part and treatment, therefore, should include thorough elimination of foci of infection.

The indications for the various procedures present a very complicated question, since the age, sex, physical condition, personality of the patient, variability of the lesion, the physiologic effect of the operation, and the skill of the surgeon, must all be taken into consideration. The more chronic the lesion, and the more motility has been impaired, and the older the patient, the clearer is the indication for gastroenterostomy. The contraindications to gastroenterostomy are the indications for those procedures which include removal of the lesion of the duodenum and reconstruction of the outlet of the stomach. Partial gastrectomy should be reserved for those patients who have had such serious bleeding that thorough removal of the first segment of the duodenum is distinctly to their advantage, and for those patients who are suspected of suffering from a high liability to recurrent ulcer.

When surgical treatment is carried out on the basis outlined, the results will show that in cases of chronic duodenal ulcer, in which operation is clearly indicated, from 85 to 90 per cent of the patients can be given complete and permanent relief of symptoms and protection against recurrence of the disease.

Discussion

DR. H. B. ZIMMERMANN (St. Paul): I would like to ask Dr. Balfour how often he sees hemorrhages after

surgical procedure such as gastroenterostomy, when probably the ulcer was not bleeding; possibly there was a gastritis and that in itself bleeds. Also, what sort of procedure he would recommend for gastritis with these duodenal ulcers? Also, what type of procedure he would use when he had done a gastroenterostomy for hemorrhage and the hemorrhage is continued? Whether he would do a simple excision or exclusion of the pylorus, or whether he would feel that subtotal gastrectomy would be the operation of choice?

DR. ARNOLD SCHWYZER (St. Paul): Though the subject is, as Dr. Balfour says, timeworn, I think a discussion of it coming from a man like him is very timely. We are in a quandary just now through all these publications on the subject. I am glad that the Doctor still speaks for the simpler operations first. When you see a pin-point ulcer of the duodenum treated by a surgeon resecting the best part of the stomach, it doesn't look quite logical nor quite fair. In my work I find that in gastroenterostomy in the earlier days I had rather better end-results than later, and I have tried to figure how that came about. In the earlier days I had been anxious to get a very good linear closure of the mucosa; that is, after sewing the posterior part of the mucosa I would allow the mucosa of the anterior side to bulge out and sewed practically surface to surface. I read an article written by a German who showed experimentally that when you put mucosa to mucosa with their surfaces together and sew them, they will heal together. The mucosa is thus everted instead of inverted. When the mucosa is inverted, as most all of us do now, you don't know how much space you have left between the ends and this may be the reason why in the earlier cases I seldom saw a marginal ulcer, but later on have had several. It is, as Dr. Balfour said, an easy thing to cure a marginal ulcer by simply disconnecting the gastroenterostomy. In resecting a posterior duodenal ulcer, as you saw in a number of Dr. Balfour's pictures, you cut through the wall of the duodenum. You open the duodenum, but sometimes it is possible to cut the ulcer away from the underlying tissue before opening the gut. I remember a very large gastric ulcer (about $2\frac{1}{2}$ by $1\frac{1}{2}$ inches in diameter) where without first opening the stomach we shaved off the pancreas, which was quite fibrous under the ulcer. We did not have to put on any ligatures because the base under the ulcer had become quite cicatricial. I think that this sometimes would make the procedure a little cleaner.

DR. A. R. COLVIN (St. Paul): I am glad Dr. Balfour paid particular attention to the question of hemorrhage. I read the editorial to which he referred in the *Journal of the American Medical Association* and the statement is made that "the average ulcer really doesn't shorten life and that surgery should largely be confined to the complications of ulcer. All that medical or surgical treatment does for ulcer is to bring about a remission of symptoms for a time." The last time Dr. Balfour spoke here on this subject of ulcer, I cited a case where gastroenterostomy had been done fourteen years before. This patient came in to see me during a period of fourteen years postoperative at

least twice a year and each time she came she was more enthusiastic as to how cured she was. At the end of fourteen years she nearly bled to death. She had a remission of her symptoms but did not have a cure of her duodenal ulcer. This is in line with the suggestion of the writer of the above editorial, *i.e.*, that we do not cure ulcer.

Of course we do cure ulcer, either by surgical or medical means, because I have seen them. I have operated on stomachs and found healed ulcers, *e.g.*, hour-glass stomachs. If Dr. Balfour seems discouraged about bleeding ulcers, I don't know what we are going to do, for we look to him for a great deal of instruction as to what to do with ulcer of the duodenum. It so happens that at the present time the subject is quite urgent with me for I have three cases in Ancker Hospital. Those three cases have impressed upon me the necessity for individualizing the question of bleeding ulcer, and are cases which I would like to have Dr. Balfour help us out on.

The first one had a gastroenterostomy done at another hospital. After three years he came to Ancker Hospital with a marginal ulcer which, at operation, was found to have nearly perforated into the colon. The gastroenterostomy was undone and a jejunostomy made, by which he was fed for two months. Again he was much relieved, but was admitted within a year for massive hemorrhage. Knowing the difficulties which would be met in exposing his duodenum after his previous operations, it was felt that in his condition of extreme anemia there were more chances in trusting to a cessation of the hemorrhage. Autopsy confirmed the opinion as to the difficulties which would have been encountered, and it was found that he had a large ulcer extending into the pancreas in the base of which was an open vessel.

The second case was in a man of forty-five who also had had a gastroenterostomy at another hospital and was admitted with a marginal ulcer perforating the colon. The gastroenterostomy was undone; he remained well for a time, and then returned because of pain unrelieved by medical care. It was found that a direct attack on the ulcer would have been too formidable a procedure; so the stomach was divided about 2 inches proximal to the pylorus, the distal portion closed, and a Polya made. His pain was relieved and he left the hospital happy, but returned in four months with a massive hemorrhage. Again knowing the magnitude of any operative procedure to expose the duodenum, surgical inactivity was decided upon, and he has recovered, his hemoglobin is 85 per cent and he is free from pain. The manner of exclusion did not prevent hemorrhage but it has relieved his pain; it is improbable that his ulcer is healed.

In the third case, the patient, a man of thirty, has had two perforations of his duodenal ulcer. At the time of his second perforation he had a gastroenterostomy done. He did well for about two years and then had so much pain that a division of his stomach two inches proximal to the pylorus was done, both ends of the stomach were closed and his old gastroenterostomy opening now served as the outlet to the proximal por-

tion. His pain was entirely relieved and he left the hospital, to return in six months blanched from a massive hemorrhage. Again the difficulty and danger of operative procedure was realized and nothing was done surgically. His hemorrhage has ceased and his hemoglobin is back to 65 per cent.

I have cited these cases in some detail, hoping that Dr. Balfour in his closing discussion will tell us, if possible, the best course to pursue. Should the two who have ceased to bleed be subjected to any further surgery?

DR. H. P. RITCHIE (St. Paul): I wonder if, in many cases, recurrence of symptoms following operation may not be explained on a mechanical basis. There was a time when there was so much debate on procedure, position on stomach, direction of the anastomosis, iso- or anti-peristaltic loop, angulation with rotation, etc. With so many technical factors to be considered, there must be cases of recurrence due to the incomplete operation. When this occurs there obtains the same conditions which produced the original lesion. I think any one doing this work can recite the history of recurrence and repeated operations, going on to a Polya before cure is effected. But I do not believe such experiences indicate the routine use of an operation more extensive than the gastroenterostomy. This operation, as so well illustrated here, is quite well standardized and I believe that Dr. Balfour's comparative statistics indicate the use of the simple procedure as a primary step in the surgical cure of duodenal ulcer.

DR. L. C. BACON (St. Paul): A few years back it was my privilege to spend some time with Mr. Walton in the London Hospital and, in discussing stomach difficulties of various types, one of his remarks impressed me. He said that his understanding was that the food habits and nutrition on the two sides of the Atlantic were so entirely different, that he wondered if the two peoples should not be guided in their care of these cases by their experience in their own country. It seems to me that Dr. Balfour's statistics would point rather distinctly to the type of procedure we should follow here, in the main.

DR. MARTIN NORDLAND (Minneapolis): I enjoyed Dr. Balfour's presentation of this subject very much and in discussion I wish to emphasize a few points. First, it must be remembered that duodenal ulcer is only a local manifestation of a general physiological change and that the treatment of duodenal ulcer becomes surgical only when complications have developed. Second, when the surgeon is confronted with a complicated case of duodenal ulcer he has a certain definite responsibility. In the presence of recurrent hemorrhage he must first be certain of the source of the hemorrhage. The patient seldom dies with the first bleeding and, therefore, it is not dangerous. Following the second hemorrhage, however, the surgeon's responsibility begins. A second hemorrhage usually means that the bleeding vessel is large. When a second hemorrhage occurs, the surgeon must advise operation even though the roentgenologist reports the absence of a duodenal ulcer. The roentgenologist must not take 100 per cent of the responsibility. Emergency procedures are un-

sound. The patient must first be put to bed on full diet and iron medication. The patient with an acute anemia is a poor surgical risk, while the individual with a chronic anemia tolerates surgery very well. The time for surgical interference then is not determined by the degree of anemia. Further, the surgeon's responsibility does not end with the operation and the immediate recovery. Complicated cases of duodenal ulcer must be followed for a long period postoperatively and the patient must be taught to cooperate. For good postoperative results the surgeon should never operate upon an undisciplined patient.

Dr. J. A. JOHNSON (Minneapolis): I enjoyed very much the exhaustive discussion Dr. Balfour presented on stomach surgery. The most troublesome type of case, in my experience, is the patient with severe gastric hemorrhage who is not in condition for surgery, and often the bleeding continues so that such patients drift into a more and more serious condition. I have found the best thing to do in these cases is to put the stomach completely at rest. This is accomplished by introducing a nasal tube attached to a suction apparatus which keeps the stomach empty of blood and gastric secretion. If the bleeding is severe and prolonged I resort to jejunostomy for the purpose of feeding. This can be done under local anesthesia without moving the patient. The stomach is then empty and at rest and nutrition can be kept up almost indefinitely. If necessary, a blood transfusion is resorted to. I am sure this has been a life-saving procedure in a number of cases of this type.

Dr. BALFOUR (in closing): I appreciate this discussion and have been much interested in the case reports that have been given. They emphasize the fact that the English reports of the seriousness of hemorrhage are not overdrawn. Patients do die of hemorrhage from ulcer, and the cases described illustrate the results of operating on exsanguinated patients. Dr. Johnson's suggestion of jejunostomy is important. If we adhere to general principles and to fundamentals in management, poor results will be kept at a minimum. I fully agree with the doctor who said that the treatment of duodenal ulcer should be individualized.

Walton's statistics and the survey made by the British Medical Association* indicate that in an average of 89.5 per cent satisfactory results may be expected to follow gastroenterostomy for duodenal ulcer if such cases are followed for a period of more than four years subsequent to operation.

The questions which Dr. Zimmermann asked are most interesting. In general, I would say that gastritis, in itself, is not justification for operation. The decision as to what should be done with the patient who has had a gastroenterostomy first necessitates determining the source of the bleeding. I have missed some cases by assuming that the primary lesion was the cause of the bleeding; recurrent hemorrhages subsequently have taken place. I think that in such cases the gastroenterostomy should be taken down. Dr. Colvin's cases illustrate the problem of recurrent hemorrhage. It is

probable that the bleeding was from a small superficial jejunal ulcer.

It is confusing to compare medical and surgical results, since the surgeon is asked to deal with a group in which medical treatment has failed. The efficiency of the management of duodenal ulcer depends to a large extent on selection of cases for various methods of treatment, both medical and surgical. The difficulty in establishing any rule of management is well illustrated by the result of a debate† before the Royal College of Physicians of England last year on the motion "that, in the absence of complications, surgical interference in cases of gastric and duodenal ulcer is unnecessary." After prolonged discussion, the vote on the debate ended in a tie: for the motion 70, and against the motion 73.

GRADUATE MEDICAL EDUCATION OF CERTAIN SORTS IN MINNESOTA

A Brief Abstract

Richard Olding Beard, M.D.

Emeritus Professor, University of Minnesota

(Since the author is under present engagement for the writing of treatises of a much more extended character, and much more inclusive of the history of medical education in Minnesota, than is this particular article; and since the Minnesota Academy of Medicine has invited a brief sketch—brief under its self-protective rules—he is withholding its publication until a later date and is confining himself to this still briefer extract, of which the author may avail himself under the Academy's rules.)

The first of these "certain sorts" of graduate medical teaching, to which this sketch refers, is that conducted by the Minnesota Academy itself and, in lesser degree, by other and similar organizations among their own members. It suggests the names of those Academy members who have most largely contributed to this type of education and who have passed away, leaving behind them those who, still living, are yet making the lives of their associates better for their presence.

The second of these agencies of graduate medical education in Minnesota, which it considers, is impersonated by the preceptors of other times who served their day and generation in their professional offspring and who laid the first foundations of medical education for their followers.

The third and most modern form of graduate medical education which it discusses is found in the more highly organized graduate medical school, or schools, of Minnesota which are distinguished from the undergraduate schools by their formal return to the principle and practice of individual as opposed to group teaching; and by their official award of graduate degrees to their successful students.

The meeting adjourned.

R. T. LAVAKE, M.D.,

Secretary.

*Luff, A. P.: Collective investigation into the after-history of gastroenterostomy. Brit. Jour. Surg. 2: 1074-1078, Dec. 7, 1929.

†Editorial on a Debate on the Treatment of Peptic Ulcer. Lancet, June 9, 1934, Vol. CCXXVI, 1: 1231-1232.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

Medical Broadcast for August

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 11:15 A. M. every Tuesday over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of August will be as follows:

- August 6—Getting Ready for School.
- August 13—Shingles.
- August 20—Diet and Health.
- August 27—Carbuncles.

Minnesota State Medical Meeting

Minneapolis, June 24, 25, 26, 1935
Registration

Physicians	1,720
Minneapolis	906
Saint Paul	321
Rochester	42
Duluth	65
Rural	213
Out of State	173
Exhibitors	262
Nurses	313
Auxiliary	410
Unclassified	29

Total 2,734

Physicians were registered from the following states:

Arizona	1	Nebraska	4
California	3	New Jersey	1
Canada	3	North Carolina	1
Florida	3	North Dakota	29
Illinois	7	Ohio	2
Indiana	1	Pennsylvania	1
Iowa	34	South Carolina	1
Kentucky	1	South Dakota	26
London, Eng.	1	Texas	2
Massachusetts	4	Washington	2
Michigan	1	Wisconsin	44
Montana	1		

The above figures from out of State are included in the grand total.

The registration of the American Association for the Advancement of Science admitted members to our meeting who consequently were not registered with us. However, several hundred of them visited our exhibits, making the total attendance around 3,800.

Minnesota Radiological Society

The annual meeting of the Minnesota Radiological Society was held in connection with the meeting of the State Medical Association in Minneapolis, June 24, 1935. Officers for the coming year were elected as follows: President, Dr. Eugene Leddy, Rochester; vice president, Dr. J. Richard Aurelius, St. Paul; secretary-treasurer, Dr. Leo G. Rigler, Minneapolis.

Northern Minnesota Medical Association

OFFICERS

President—G. I. BADEAUX, M.D., Brainerd, Minn.
Vice President—A. C. COLLINS, M.D., Duluth, Minn.
Sec'y-Treas.—O. O. LARSEN, M.D., Detroit Lakes, Minn.

The annual meeting of the Northern Minnesota Medical Association will be held at Duluth, August 12 and 13, 1935. Headquarters will be at the Hotel Duluth.

Monday, August 12, will be devoted to the presentation of scientific papers at morning, afternoon and evening sessions.

Tuesday, August 13, at 9 a. m., members and guests will board the steamer Noronic for a trip up the North Shore of Lake Superior, returning at 2:00 p. m. Five-course dinner.

Tuesday's program on the boat will include Dr. Preston Bradley, Pastor of People's Church, Chicago, and President of the National Izaak Walton League, as chief speaker.

Scott-Carver Counties

The Scott-Carver Counties Medical Society met at Arlington, Minnesota, July 9, with dinner at the Hotel Arlington at 7:30 o'clock.

The program, presented by two Minneapolis physicians, was as follows:

Dermatitis Therapy—H. G. Irvine, M.D., Minneapolis.
Eye, Ear, Nose and Throat Topics—E. A. Loomis, M.D., Minneapolis.

Southern Minnesota Medical Association

The Southern Minnesota Medical Association will meet at Austin, Minnesota, under the presidency of Dr. S. A. Slater, August 25 and 26, 1935.

Sunday afternoon there will be an informal get-together at the Austin Country Club. Anyone wishing to play golf will have that opportunity. A buffet supper will be served at the Club at six o'clock, and at eight o'clock there will be a meeting at the High School to which the physicians and their families and friends as well as the general public are invited as the guests of the Mower County Medical Society and the Southern Minnesota Medical Association. This meeting will be addressed by Dr. Morris Fishbein. His subject will be of interest to the physicians and their lay friends.

The meeting proper will open at eight o'clock on

BOOK REVIEWS

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

EMOTIONS AND BODILY CHANGES. H. Flanders Dunbar, M.D., Ph.D., Departments of Medicine and Psychiatry, Columbia University. 595 pages. Price, cloth, \$5.00. New York: Columbia University Press, 1935.

THE PRINCIPLES AND PRACTICE OF MEDICINE. The late Sir William Osler, B.T., M.D., F.R.S. Twelfth Edition, revision by Thomas McCrae, M.D., Fellow Royal College of Physicians, London, etc. 1196 pages. Illus. Price, cloth, \$8.50. New York: D. Appleton-Century Co., 1935.

OBJECTIVE AND EXPERIMENTAL PSYCHIATRY. D. Ewen Cameron, M.B., Ch.B. (Glas.), D.P.M. (Lond.). Physician in Charge Reception Service, Provincial Mental Hospital, Brandon, Man., etc. 271 pages. Price, cloth, \$3.00. New York: The MacMillan Co., 1935.

ARTHRITIS AND RHEUMATOID CONDITIONS. Ralph Pemberton, M.S., M.D., F.A.C.P. Professor of Medicine in Graduate School of Medicine, Univ. of Pennsylvania, etc. 455 pages. Illus. Price, cloth, \$5.50. Philadelphia: Lea & Febiger, 1935.

ANNUAL REPRINTS OF THE REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR 1934, WITH THE COMMENTS THAT HAVE APPEARED IN THE JOURNAL. Cloth. Price, \$1. Pp. 135. Chicago: American Medical Association, 1934.

Each succeeding volume of reports of the Council reveals more of the long and successful fight in the interest of rational therapeutics. The Council is no longer chiefly concerned with noisome proprietaries and yet this latest volume contains reports on such articles as "Vita-Cell," a secret preparation marketed with exaggerated claims, and "Raylos," a shotgun preparation marketed in a way to promote its ill advised use by the public. Most of the "unacceptable" reports in this volume are concerned with products that may have some merit but are not offered to the public in a way which experience has taught the Council is necessary before a therapeutic agent is acceptable. Such products are Iodine Dusting Powder (Sulzberger), rejected for lack of clinical evidence of its advantage over one of its constituents; Pernoston, rejected because of lack of clinical evidence to justify routine intravenous injection

Monday morning with a medical and surgical Clinic by the Mower County physicians. During the morning session there will be group meetings at which time various phases of medicine, including cardiac disease, diseases of the stomach, contagious diseases of children, mastoid infections and their treatment, arthritis, prostatic hypertrophy, and so forth, will be discussed. A luncheon and business meeting will be held at noon and a formal program in the afternoon. On account of the general widespread interest in the glands of internal secretion, this subject will hold a prominent place on the program. The banquet will be held in the evening at the Austin Country Club.

H. C. HABEIN,
Secretary-Treasurer

Wabasha County

The sixty-seventh annual meeting of the Wabasha County Medical Society was held at Old Frontenac on Thursday, July 11, 1935.

At the business session in the afternoon, the following officers were elected for the coming year:

President, Dr. C. G. Ochsner, Wabasha; vice president, Dr. B. A. Flesche, Lake City; secretary-treasurer, Dr. W. F. Wilson, Lake City; delegate to State Association, Dr. E. C. Bayley, Lake City; alternate, Dr. R. H. Frost, Wabasha; censor for three years, Dr. D. S. Fleischhauer, Wabasha; censors holding over, Dr. J. A. Slocumb, Plainview, and Dr. W. J. Cochran, Lake City.

Upon invitation of Doctor Slocumb, it was voted to hold the next annual meeting at Plainview.

A six o'clock dinner was served to those attending, at Frontenac Inn, through the courtesy of Dr. and Mrs. Radabaugh of Hastings.

Following the dinner, special entertainment was provided for the ladies, and the scientific program was presented as follows:

President's Address—Case Report

"Fecal Impaction Following Cholecystitis"

Rudolph C. Radabaugh, M.D., Hastings

"Breech Presentation" . . . Alfred Belitz, M.D., Pepin, Wis.

"Injection Method Versus Open Treatment of Hernia" George A. Earl, M.D., Saint Paul

"Diagnosis and Office Treatment of Diseases of the Rectum" . . . Harold E. Hullsiek, M.D., Saint Paul

"A Summary of the Present Knowledge of the Hormones of the Anterior Lobe of the Pituitary Gland" Edward H. Rynearson, M.D., Mayo Clinic, Rochester.

There were twenty-six in attendance: Fifteen medical men, three affiliated dentists, and eight ladies in the families of doctors attending. A special vote of thanks was extended to the guest speakers for their instructive talks, and to Dr. and Mrs. Radabaugh for providing this enjoyable occasion.

W. F. WILSON, *Secretary*.

BOOK REVIEWS

of barbital compounds; Di-Hydranol, a claimed bactericidal agent proposed for use as an "intestinal antiseptic," a claim not supported by sufficient clinical evidence; and Squibb Adex Tablets, a product containing a concentrate of vitamins A and D, for which the firm could not agree to adopt a more informative name.

To those who have followed the Council's investigation of *B. acidophilus* therapy, the report "Acidophilus Bacillus Liquid-Mulford and Mulford Acidophilus Bacillus Block Omitted from N. N. R." will be of interest. The Council has apparently not yet reached an ultimate conclusion concerning acidophilus therapy, but it has for years held that no product could be expected to be of value unless it could show at least one hundred million viable *B. acidophilus* organisms at the "date of expiration." Competent bacteriologic examination showed that the two preparations here reported were inferior to this standard. Further grounds for omission were the failure of the manufacturer to comply with certain stipulations in regard to labels and advertising. Another noteworthy omission is that of Alpha-Naphco and its dosage forms, omitted because the Council on reconsideration found that it is a weak antiseptic.

The Council also issues preliminary reports, which define the status of new preparations for which the evidence is not yet sufficient to justify their presentation to the medical profession generally. Preliminary reports do not imply rejection but rather postponement of consideration until more evidence is reported by competent investigators. These reports are the outposts of therapeutic progress and as such are valuable sources of information to physicians. In this volume there are preliminary reports on Adrenal Cortex Extract, concerned mostly with scientific terminology, Cysteine Hydrochloride, Dihydroxy-Anthranol (Anthralin), Gastric Mucin, Hemoprotein (Brooks), Phenylmercuric Nitrate and Phenylmercuric Chloride.

Illustrative of the Council's efforts to keep those concerned informed of the basis for its actions are the "Recent Revisions or Elaborations of the Council's Rules of Interest to Manufacturers and the Medical Profession," which have appeared in the last two volumes. These inform the profession of the various problems which arise and the care given to their consideration. To be commended also is the "Report on Sterility of Ampule Preparations."

TUBERCULOSIS. A book for the patient. Fred G. Holmes, M.D., Director of the National Tuberculosis Association. 312 pages. Price, \$2.00. New York: D. Appleton-Century Co., 1935.

To the patient who is suffering from a chronic illness, there are many questions confronting him which usually go unanswered. This is perhaps chiefly manifested in one who has tuberculosis. His physician usually has little time to answer more than a few of them. In this book, the author succeeds in answering almost any problem that might arise. He discusses with the patient the various stages of tuberculosis and

the purposes of the treatment prescribed. He impresses upon the individual the importance of various measures which are necessary in successful treatment. He makes this discussion more easily understood by dividing the subject under two heads; the first dealing with the patient who requires no surgical procedure and the second the treatment required when the usual procedures are unsuccessful. This is handled very well and in a manner that can be understood by the average individual. Technical terms are avoided as much as possible, and, when they are used, the accompanying definition simplifies them.

The chapter on patent medicine is very appropriate. The author confines to the last chapter a discussion on medical ethics. He tells the patient why certain practices should be avoided in dealing with consultants, etc.

In general the book is very interesting and should be of considerable value, not only to the patient, but also to any physician.

JOSEPH M. RYAN, M.D.

MORE NOSTRUMS IN RETROSPECT

The chief work of the Bureau of Investigation lies in answering the thousands of letters that are received every year from physicians and laymen asking for information on "patent medicines" and quacks. The following "patent medicines," concerning which longer articles have been published previously, are among those about which the Bureau receives a large number of inquiries: *Absorbine, Jr.*, which, according to the analysis made in the A.M.A. Chemical Laboratory, was a clear, bright green liquid having a strong, penetrating, mint-like odor and seemed to be an acetone extract of some plant, probably wormwood, with the possible addition of some oil of sassafras and oil of menthol. *Alka-Seltzer*, which was reported to be essentially aspirin together with salicylic acid, citric acid and baking soda. *Bromo-Seltzer*, an average dose of which—a teaspoonful, weighing about 76 grains—was reported to contain potassium bromide, 7 grains, acetanilid, 3 grains, and caffeine, 0.8 grain. The *Converse Treatment for Epilepsy* was reported to be one of the bromide mixtures and a person taking the stuff in accordance with the directions would get an amount of bromide equal to 58 grains of potassium bromide daily. The *Hayes Asthma Treatment*, consisting mainly in the administration of iodides, together with a cough remedy, some iron and quinine, with, of course, the inevitable laxative. *Hunter's Epilepsy Treatment*, according to the analysis made by the Chemical Laboratory of the American Medical Association, was about one-fourth phenobarbital (luminal) and three-fourths milk sugar! *Dexo*, another alleged remedy for epilepsy, was reported to be a bromide mixture. *Lane's Asthma Treatment*, each dose of which was reported to contain approximately 2½ grains of calcium iodide, giving a daily dosage equivalent to 11.3 grains of potassium iodide. *Tums*, reported to be apparently nothing more marvelous than sugar and chalk flavored with peppermint. (J.A.M.A. June 8, 1935, p. 2114.)